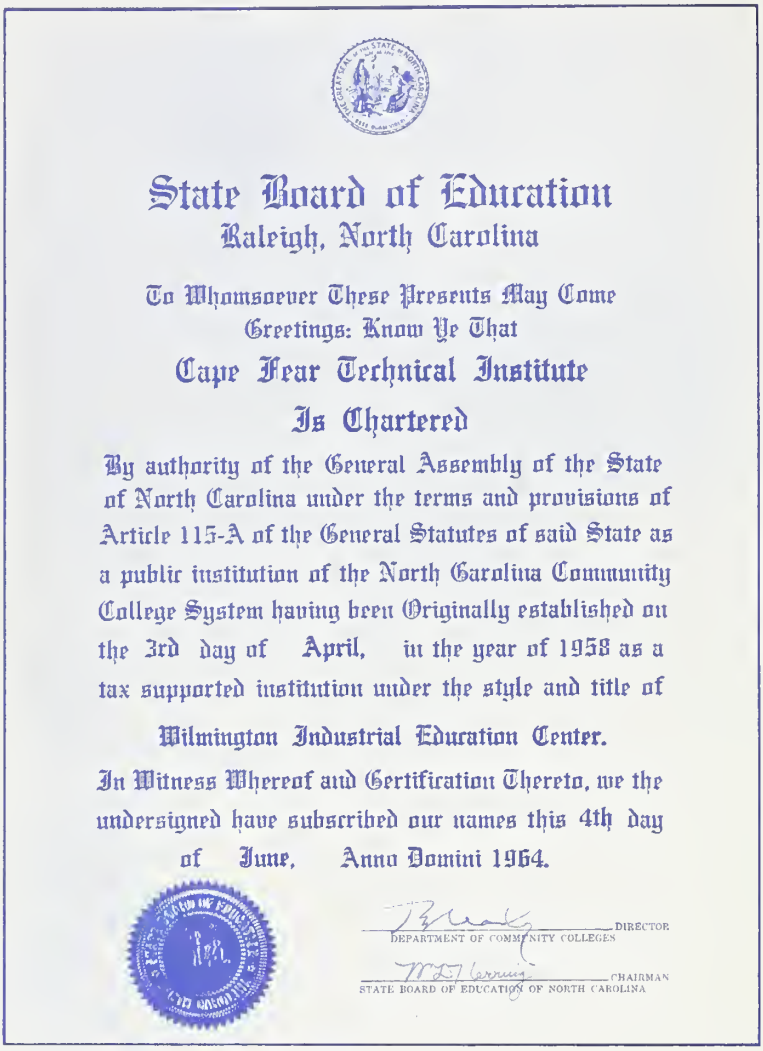
CAPE FEAR TECHNICAL INSTITUTE

CATALOGUE 1973 – 1974



State Board of Education
Raleigh, North Carolina

To Whomsoever These Presents May Come
Greetings: Know Ye That

Cape Fear Technical Institute

Is Chartered

By authority of the General Assembly of the State of North Carolina under the terms and provisions of Article 115-A of the General Statutes of said State as a public institution of the North Carolina Community College System having been Originally established on the 3rd day of April, in the year of 1958 as a tax supported institution under the style and title of

Wilmington Industrial Education Center.

In Witness Whereof and Certification Thereto, we the undersigned have subscribed our names this 4th day of June, Anno Domini 1964.

DIRECTOR
DEPARTMENT OF COMMUNITY COLLEGES

CHAIRMAN
STATE BOARD OF EDUCATION OF NORTH CAROLINA

Cape Fear Technical Institute is a member institution of the North Carolina Department of Community Colleges—A fully accredited member of the Southern Association of Colleges and Schools—and is accredited by the North Carolina State Board of Education.

CAPE FEAR TECHNICAL INSTITUTE

411 NORTH FRONT STREET
WILMINGTON, N. C. 28401
PHONE 919-763-9876

Catalogue of Information

1973 - 1974

General Information ..... White

Technical Division ..... Green

Trade Division ..... Yellow

Extension & General Adult Division ..... Blue

Volume VIII April 1973

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Foreword

The Cape Fear Technical Institute was founded as an area school to meet the occupational training needs of the people of Southeastern North Carolina and of the growing industrial community.

Every effort has been made to provide the equipment, facilities and skilled teachers necessary to allow maximum opportunities for the people to develop new skills, up-date old skills, and further their knowledge to enhance their value to industry and promote their own personal growth.

North Carolina has the most valuable of all resources, a vast reservoir of good people who make fine citizens and excellent employees. Therefore, Cape Fear Technical Institute pledges itself to continue to do all in its power to provide the educational opportunities needed by people to meet the challenging needs of modern industry and help them grow in their understanding and enjoyment of life.

M. J. McLEOD
President

Note

The Cape Fear Technical Institute issues this catalogue for the purpose of furnishing prospective students and other interested persons with information about the institution and its programs. Announcements contained herein are subject to change without notice and may not be regarded in the nature of binding obligations on the Institute or the State. Efforts will be made to keep changes to a minimum, but changes in policy by the State Board of Education, the Department of Community Colleges, or by local conditions may make some alterations in curriculums, fees, etc. necessary.

Visitors

Visitors, and in particular prospective students, are always welcome at Cape Fear Technical Institute. The student personnel office will provide guide service for groups or individuals on week days between 8:00 a.m. and 5:00 p.m. The school is open until 10 p.m. and individuals may visit at their convenience. Questions about the school and its programs will be answered by someone from the student personnel office.

Statement of Policy

The contact hours shown in the catalogue are minimal. It is a policy of this institution to permit students to enroll in additional subjects and laboratory work beyond those shown in the catalogue.

When in any quarter the total weekly contact hours listed are fewer than twenty-five hours in a technical curriculum and fewer than thirty hours in a vocational trade curriculum, a student may enroll on request for additional instructional hours deemed by the institution to be consistent with the program and appropriate to the student to make up twenty-five hours per week in a technical curriculum or sufficient hours of attendance to make up thirty hours per week in a vocational trade curriculum.

Institutional Memberships

An Institutional Member of the American Association of Junior Colleges.

An Institutional Member of the American Technical Society.

An Institution of the North Carolina Department of Community Colleges.

Accredited as a Special Purpose Institution by the Southern Association of Colleges and Schools.

Accredited by the North Carolina State Board of Education.

INFORMATION GENERAL

CAPE FEAR TECHNICAL INSTITUTE

SCHOOL CALENDAR

1973 - 1974

FALL QUARTER

Freshman Registration & Orientation	September 4, 1973
Second Year Students Registration	September 5, 1973
Classes Begin for All Students	September 6, 1973
Classes End	November 21, 1973

Thanksgiving Holidays between Quarters

WINTER QUARTER

Pre-registration	November 20 & 21, 1973
Registration	November 26, 1973
Classes Begin	November 27, 1973
Classes End	February 27, 1974
Christmas Holidays	December 17-31, 1973
New Year's Holiday	January 1, 1974

SPRING QUARTER (1974)

Pre-registration	February 26 & 27, 1974
Registration	March 4, 1974
Classes Begin	March 5, 1974
Classes End	May 23, 1974
Easter Holidays	April 12-16, 1974

SUMMER QUARTER (1974)

Pre-registration	May 22 & 23, 1974
Registration	May 28, 1974
Classes Begin	May 29, 1974
Classes End	August 14, 1974
Holiday	July 4, 1974

STATE ADMINISTRATION

Benjamin E. Fountain, Jr.—State President, Department of Community Colleges

STATE BOARD OF EDUCATION

Dallas Herring	Rose Hill, Chairman, District 2
John A. Pritchett	Windsor, Vice-Chairman, District 1
James B. Hunt	Lieutenant Governor, Ex Officio
Edwin Gill	State Treasurer, Ex Officio
G. Douglas Aitken	Charlotte, District 6
R. Barton Hayes	Hudson, District 7
R. R. Manz	Roanoke Rapids, District 3
Earl Oxendine	Raeford, District 4
Mrs. Evelyn S. Tyler	Greensboro, District 5
John W. Reynolds	Asheville, District 8
Mrs. Mildred S. Strickland	Smithfield, Member-at-large
Dr. Prezell R. Robinson	Raleigh, Member-at-large
Richard C. Erwin	Winston-Salem, Member-at-large
A. Craig Phillips	Secretary to the Board

LOCAL BOARD OF TRUSTEES

William Emmart, Chairman, First-Citizens Bank & Trust Co., 8 North Front Street, Wilmington, N. C.
R. L. Burnett, Vice-Chairman, New Hanover Memorial Hospital, Wilmington, N. C.
V. A. Creech, Jr., Fairview Road, Leland, N. C.
L. M. Cromartie, 420 W. Shipyard Boulevard, Wilmington, N. C.
Luther D. Dunn, E. I. DuPont de Nemours, Cape Fear Plant, Leland, N. C.
Dr. Hubert A. Eaton, 411 North Seventh Street, Wilmington, N. C.
Fred J. Galehouse, 110 Green Forest Drive, Wilmington, N. C.
Howard Holly, Burgaw, N. C.
Alfred A. Johnston, 2617 Mimosa Place, Wilmington, N. C.
Eugene McWatty, S & G Concrete, 2812 Monroe Street, Wilmington, N. C.
W. Mercer Rowe, South Atlantic Services, Inc., Post Office Box 28, Wilmington, N. C.
Frederick Willetts, Jr., Cooperative Savings & Loan Association, 201 Market Street, Wilmington, N. C.
C. McD. Davis—Member Emeritus, Porters Neck Plantation, Wilmington, N. C.

OFFICERS OF THE ADMINISTRATION

M. J. McLeod	President
Clarence E. Dodgens	Dean of the Institute
Ralph Bordeaux	Director of Evening Programs
E. T. Satterfield, Jr.	Dean of Student Affairs
Matthew C. Donahue	Director of Technical & Vocational Programs
John R. Kennedy	Director of Continuing Education—Brunswick
Kenneth D. Futch	Director of Continuing Education—Pender
Fitzhugh Fennell	Director of Continuing Education—New Hanover
John M. Braswell	Director of Basic Adult Education
S. C. Coleman	Business Manager
Sadie M. Lea	Bookkeeper
Gwendolyn W. Smith	Bookkeeper
Ronald G. Mihal	Administrative Assistant
Robert D. Bass	Registrar
Carl E. Malpass	Counselor
Charles F. Hunnicutt	Counselor
Roger A. Greenleaf	Evening Registrar—Counselor
Henry J. Bethea	Director of Student Activities

AREA COORDINATORS

W. K. Dorsey	Tourist Training
John R. Willis	Fishing Trades
Ralph W. Roper	Police Training

LEARNING RESOURCE CENTER

Willie B. McGough, Jr.	Director of Library Learning Resource Center
Roy T. Barnhill	Librarian
Nixon B. Howard	Library Technician
Alta W. Moore	Library Technician

PROGRAMMED INSTRUCTION CENTER

Charlotte Dexter	Director
Thomas J. Bradshaw	Coordinator
Ernest D. Bryant	Coordinator
Christopher K. Zingelmann	Coordinator
Mary N. Corbett	Part Time Coordinator

FACULTY

Adams, Jim	Fishing Trades
Ambrose, Blanche W.	Chairman, Nursing Education
Averette, Roger H.	Chairman, Related Subjects Division
Barefoot, Emily W.	Business Education
Barker, William G.	Sub-Division Head Academic Related
Bass, Mary P.	Nursing Education
Batts, Chauncey W., Jr.	Chairman, Engineering Division
Blair, Janet G.	Coordinator of Disabled & Handicapped Programs
Bright, Ladson	English
Buck, Dale R.	Oceanography
Coleman, William H., Jr.	Head, Instrumentation Dept.
Cooper, Claude	Social Science Related
Cooper, Ida	English
Coleman, Mary B.	Business Education
Cullom, Anne	Business Education
Eckhardt, Owen S.	Head, Chemical Technology Dept.
Faison, James H., Jr.	Related Subjects
Foss, Edward L.	Chairman, Marine Technology Division
Gladding, Thomas, Jr.	Navigation
Horton, Grag	Head, Air Conditioning Department
Jordan, Captain Arthur W.	Coordinator, Ship Operations
Jorgensen, Philip C.	Related Subjects
Klimek, Francis B.	Chairman, Mechanical Division
McClelland, Roy K.	Marine Engineer
Mangum, William A.	Mathematics
Marteney, Lawrence L.	Sub-Division Head Mechanical and Engineering Related
Martin, James R.	Biology
Meyland, Sarah	Marine Technology Related
Naples, John R.	Head, Electronics Department
Nichols, Jeffrey	Basic Job Instructor for Disabled & Handicapped Persons
Nunn, James R.	Head, Machine Trades Department
Nunnery, Frances A.	Basic Job Instructor
Raynor, Bruce	Assistant Marine Superintendent
Remington, George L.	Related Subjects

Rhodes, Samuel T.	Biology
Seeger, David C.	Related Subjects
Sessoms, Robert W.	Head, Business Education Division
Simmons, Wayne P.	Head, Radio & Television Dept.
Spencer, Joel S.	Drafting
Stroman, Arthur W., III	Electronics & Related
Townsend, Robert	Business Education
Tyndall, Roland E.	Business Education
Watters, James L.	Head, Welding Department
Williams, Alvin	Welding
West, Geraldine J.	Business Education
Young, John C., Jr.	English

TECHNICIANS

Black, Brian L.	Inventory Technician
Carter, Marie	Marine Lab Technician
Daniels, William Steve	Graphics Artist Technician
Howard, Nixon B.	Audio-Visual Technician
Huddleston, Marvin E.	Equipment & Inventory Technician
Malpass, Mitchell A.	Marine Technician
Miller, Mark	Marine Technician
Thomas, John D.	Marine Technician
Whichard, Judson E.	Chemical Technician

SHIP PERSONNEL

Jordan, Arthur W.	Coordinator of Ship Operations & Chief Investigator for Sea Grants
Burns, Francis	Captain

Deck Department

Lewis, Ed	Chief Mate
Wolfe, Ernest	2nd Mate
DeVane, James	Able Bodied Seaman
Gray, Frank	Able Bodied Seaman
Roberts, John	Bosun
King, Gerald	Ordinary Seaman
Frank, Andrew	Chief Cook
Fisher, Wallace L.	1st Cook
Cowan, Frank	Officers Steward

Engineering

Watson, Harold	Chief Engineer
McNamara, John	1st Engineer
Unverferth, Robert	Oiler
Lisk, Robert B.	Oiler

Specialists

Hansley, Mitchell	Electrician
Sigman, Roy	Electrician
Irving, John	Welder
Raynor, Bruce	Assistant Marine Superintendent
Malpass, Mitch	Marine Technician
Ballard, Frank	Welder
Weddle, Daniel J.	Chief Electronics Technician

THE SCHOOL

HISTORY

The Cape Fear Technical Institute was established as the Wilmington Industrial Education Center in 1959 under the direction of the late George H. West. It was raised to technical institute status on July 1, 1964.

Cape Fear Tech is one of more than fifty such institutions operated by the State under the direction of the State Board of Education and the Department of Community Colleges in Raleigh. The school is administered by a local Board of Trustees.

Authority for the establishment and operation of these institutions is found in Chapter 115A of the General Statutes of North Carolina and the amendments thereto.

The Institute was one of the original industrial education centers and was operated from 1959 through the 1963 school year by the New Hanover Board of Education. Following a favorable vote of the citizens of the County on a $575,000 bond issue to provide a technical institute facility, and a 2c tax levy for its support, the State Board of Education authorized $500,000 in matching funds from the 1963 Vocational Education Act Appropriation to be applied toward the facility construction. The Institute continued to operate in the County owned buildings until the new facilities were completed in the summer of 1967. The new facilities included a four story main building, a separate automotive shop, and a pier and docking facility for the school's ship, the Advance II. In the general election of 1972 the citizens of New Hanover County approved a bond issue of $3,675,000.00 for the expansion of Cape Fear Technical Institute's facilities. Construction will include additions to the Main Building and additional shop facilities. Constructon will continue throughout 1973 and 1974 with completion scheduled for 1975.

The number of people served annually by the Institute has risen from approximately 750 during its early years of operation to more than 12,000 in recent years. The school has been and continues to be dedicated to total education for adults in the area it serves.

PURPOSE

Cape Fear Technical Institute is comprehensive in its purpose and in its plan to meet the needs of the adult population within the community it serves. The Institute provides flexible programs designed to meet these adult educational needs through:

(1) A continuing concern for the total welfare of each student including his physical and mental health, development of capaci-

ties and talents, establishment of relationships with other persons, and motivation for progress in intellectual understanding.

(2) Various vocational-technical and trade programs which will prepare a student for employment in a specialized field.

(3) Courses and programs for the adult student who wishes to further his education at the elementary and secondary level, or for an adult who wishes to improve his economic, social, or cultural needs.

(4) Programs to serve new and existing industries by training new employees and upgrading others.

(5) Programs to serve the community by training employees for public services.

(6) Continuous curriculum study and revision of existing programs to meet the needs of the community.

Finally, the Institute strives to live up to the "open door" admissions policy established by the North Carolina Department of Community Colleges. The Institute is concerned with the student's willingness to do, and with providing entry programs at all capability levels. The Institute encourages the student to develop abilities and attitudes which will make him feel that he is a participating, worthwhile, dignified member of his community.

LOCATION

The Cape Fear Technical Institute is conveniently located in the heart of Wilmington on North Front Street. The campus extends from Front Street to the deep water channel of the Cape Fear River, and is bordered by Red Cross Street on the North and Walnut Street on the South. Some parking space is available on the campus, public transportation is nearby, and hotels, motels, restaurants, theaters, and shops are all within easy walking distance.

The four-story building houses the administrative offices, library, laboratories, classrooms, student lounge, and part of the shop areas. An additional shop building is located at the water's edge, and a pier extends out to the deep-water channel to provide mooring for the 185-foot school ship, the SS Advance II. The buildings are of all-masonry construction, and designed especially for trade and technical programs. All classrooms and offices are air-conditioned for year-round comfort.

The Wilmington area has abundant recreational facilities, excellent beaches, salt- and fresh-water fishing, good hunting areas; year-round golf courses and tennis courts are all located within a few minutes driving range.

SHOPS & EQUIPMENT

The shops and laboratory areas were carefully planned to provide large, well-ventilated, and industry-type training facilities.

Equipment for all shops, laboratories, test areas, drafting rooms, and for the training ships was selected to conform with the current tools and devices of industry. Students will find that ample opportunity is provided in all trade and technical curricula for skill-building practice in using modern, industrial, production and testing tools and machines. Specially planned and equipped classrooms are conveniently located for study of the academic related subjects, and a well-stocked technical library is available both day and night for use by faculty, students and area residents.

QUARTER SYSTEM

The school year is divided into four quarters of 55 school days. Credits earned are in quarter hours. See course description section for number of credits required for graduation in each program.

AREAS OF STUDY

Technical and trade curriculums which the Institute is presently authorized to offer include the following:

Technical Curriculums:

See technical section (Green) of catalogue for descriptions.

Business Administration
Chemical Operations Technology
Drafting & Design Technology
Electronics Technology
General Office Technology
Instrumentation Technology
Marine Laboratory Technology
Marine Technology
Marine Electronics (Special Technology, one quarter only)
Secretarial-Engineering and Technical

Persons graduating from these technical curriculums are awarded the Associate in Applied Science Degree.

Vocational Curriculums:

See trade section (Yellow) of catalogue for descriptions.

Auto Body Repair
Automotive Mechanics
Drafting, Mechanical
Heating and Air Conditioning

Machine Trades
Marine Diesel Mechanics
Operating Room Assistant—This course offered periodically
Practical Nurse Education
Radio and Television Servicing
Welding

A diploma is earned by graduates of these vocational programs.

ENTRANCE REQUIREMENTS

All correspondence concerning admissions should be addressed to The Dean of Student Affairs.

ADMISSION OF NEW STUDENTS—The Cape Fear Technical Institute follows the "Open Door" policy established by the State Board of Education. This policy provides for the admission of any North Carolina citizen who has reached the age of 18, or whose high school class has graduated. This policy is based on the belief that the school has something to offer at all educational levels and that through effective guidance a person can find his or her place in the proper educational program.

While a high school education or its equivalent*, is desirable for admission to the full-time training programs, some exceptions are made for individuals whose age and maturity make success in a diploma program likely.

See individual course description in this catalogue for specific admission requirements, prerequisites, etc., for each course.

ADMISSION CRITERIA

1. **Previous Education**—Each applicant shall request his or her high school to submit a transcript showing graduation. Those who are high school seniors should have their school submit a transcript showing work through the first semester of the senior year as soon as possible after the semester has ended, and a supplementary transcript showing graduation at the close of school.

Applicants who have the high schol equivalency certificate* should submit a copy of the certificate, but should also ask their high school to send transcript of all work done at the school.

Transcripts of previous education in colleges, technical institutes, etc., should also be submitted to the school. All transcripts must come directly from the school to the Technical Institute and not from the applicants themselves.

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*See page 144 in General Adult Education Section for details about the high school equivalency certificate.

2. **Scores on Test Battery**—Students are required to take admission test/s prior to entrance. Qualified counselors at the school use the test results in helping individuals decide which course of study to follow. There is no charge for the test, nor for the counseling service.

3. **Personal Interview**—The personal interview is beneficial to both the applicant and to school officials in that it affords an opportunity to "get acquainted." The applicant has an opportunity to ask questions about the school and its programs while school officials make an effort to evaluate the applicant's interest in, and capability to pursue the program of study applied for.

4. **Physical Examination**—Complete medical form provided by the school.

ADMISSION OF OUT-OF-STATE STUDENTS—Out-of-state students are admitted under the same regulations as others. Tuition and fees are established by the State Board of Education.

1. **General:** The tuition charge for legal residents of North Carolina is less than for nonresidents. To qualify for in-state tuition, a legal resident must have maintained his domicile in North Carolina for at least the twelve months next preceding the date of first enrollment or re-enrollment in an institution of higher education in this state shall not constitute eligibility for residence to qualify said student for in-state tuition.

2. **Minors:** A minor is any person who has not reached the age of eighteen years. The legal residence of a person under eighteen years of age at the time of his first enrollment in an institution of higher education in this state is that of his parents, surviving parent, or legal guardian. In cases where parents are divorced or legally separated, the legal residenc of the father will control unless custody of the minor has been awarded by court to the mother or to a legal guardian other than a parent. No claim of residence in North Carolina based upon residence of a guardian in North Carolina will be considered if either parent is living unless the action of the court appointing the guardian antedates the student's first enrollment in a North Carolina institution of higher education by at least twelve months.

3. **Adults:** An adult is any person who has reached the age of eighteen years. Persons, eighteen or more years of age at the time of first enrollment in an institution of higher education, are responsible for establishing their own domicile. Persons reaching the age of eighteen, whose parents are and have been domiciled in North Carolina for at least the preceding twelve months, retain North

Carolina residence for tuition payment purposes until domicile in North Carolina is abandoned. If North Carolina residence is abandoned by an adult, maintenance of North Carolina domicile for twelve months as a non-student is required to regain in-state status for tuition purposes.

4. **Married Students:** The legal residence of a wife follows that of her husband, except that a woman currently enrolled as an in-state student in an institution of higher education may continue as a resident even though she marries a nonresident. If a husband is a nonresident and separation or divorce occurs, the woman may qualify for in-state tuition after establishing her domicile in North Carolina for at least twelve months as a nonstudent.

5. **Military Personnel:** No person shall lose his in-state resident status by serving in the Armed Forces outside of the State of North Carolina. A member of the Armed Forces may obtain in-state residence status for himself, his spouse, or his children after maintaining his domicile in North Carolina for at least the twelve months next preceding his or their enrollment or re-enrollment in an institution of higher education in this state.

6. **Aliens:** Aliens lawfully admitted to the United States for permanent residence may establish North Carolina residence in the same manner as any other non-resident.

7. **Property and Taxes:** Ownership of property in or payment of taxes to the State of North Carolina apart from legal residence will not qualify one for the in-state tuition rate.

8. **Change of Status:** The residence status of any student is determined as of the time of his first enrollment in an institution of higher education in North Carolina except:

(a) in the case of a nonresident student at the time of first enrollment who has subsequently maintained domicile as a nonstudent for at least twelve consecutive months and

(b) in the case of a resident who abandons his legal residence in North Carolina.

In either case, the appropriate tuition rate will become effective at the beginning of the first subsequent term enrolled.

9. **Responsibility of Students:** Any student or prospective student in doubt concerning his residence status must bear the responsibility for securing a ruling by stating his case in writing to the Dean of Students. The student who, due to subsequent events, becomes eligible for a change in classification, whether from out-of-state to in-state or the reverse, has the responsibility of immediately in-

forming the Dean of Students of this circumstance in writing. Failure to give complete and correct information regarding residence constitutes grounds for disciplinary action.

ADMISSION OF TRANSFER STUDENTS—The Dean of Student Affairs along with the Dean of The Institute and Department heads will review applications for admission with advanced standing. Where subject content and length of course are comparable with those in the curriculum applied for, credit may be allowed for grades of "C" or above. Transfer credits will not influence the students grade point average while at Cape Fear Technical Institute. In certain cases where the school and the student believe an alternate course would be more beneficial to the student, such alternate course may be allowed.

TRANSFER WITHIN THE INSTITUTE—Students that desire to change from one program to another may have their records reviewed for possible transfer of credit. In cases where grades are acceptable, and prior course work is applicable to the new curriculum, transfer may be allowed. Transfer of credits will not influence the student's Grade Point Average in the new program.

PROFICIENCY EXAMINATION—Credit by proficiency examination may be given for a course. Eligibility to take a proficiency examination may be based on high achievement in secondary school, post secondary schools, or experience. Arrangements for examination should be made with the major subject instructor and Dean of Student Affairs.

ADMISSION OF FORMER STUDENTS—All former students who left the school in good standing are encouraged to enroll for additional study at the Institute.

REGISTRATION—Students who have been admitted, and who have paid their admission deposit (see page 17 for information on this deposit) will register on the dates set by the school for this purpose. Students will obtain their class schedules, pay their fees and purchase their books. Late registrants are charged a $5.00 late registration fee.

HOUSING—The Institute does not have housing facilities, but students have had no difficulty in locating satisfactory housing quarters. Some places provide room and board at moderate rates. School officials will assist students in finding housing, but cannot assume responsibility beyond this. Students and landlords should have a complete understanding with regard to rental conditions, so that there will be no misunderstanding concerning such details.

HOW MUCH DOES IT COST?—All fees are established by the State Board of Education. Currently tuition is charged at the following rates for all curriculum courses:

North Carolina Students:

Full Time ..... $32.00 per quarter
Part Time ..... $2.50 per quarter hour credit

Out-of-State Students:

Full Time ..... $137.50 per quarter
Part Time ..... $11.45 per quarter hour credit

Books and small tools are purchased by students as they are needed. Books cost on the average approximately $90.00 per year. Costs of tools vary with the course of study, but do not ordinarily exceed $20.00 for a year. A $12.00 activity fee is charged for the year.

All students who work in laboratories or shops are required to purchase accident insurance; this insurance presently costs $3.50 per year. The cost of insurance is subject to change as determined by the company offering the coverage.

WHEN ARE PAYMENTS MADE?

When an applicant is officially admitted to a course of study, he is required to make a $15.00 tuition deposit. This deposit is nonrefundable except in cases where the school is unable to admit the person or unable to offer the course applied for.

All tuition charges shall be paid in full on registration day, however in hardship cases, monthly payments may be permitted. Any exceptions to rules on financial affairs must be approved by the Business Office.

The accident insurance is purchased on registration day of the first quarter of attendance.

No student will be permitted to graduate, nor will a transcript be issued until all financial obligations to the school are satisfied.

REFUND

Tuition refund for students shall not be made unless the student is, in the judgment of the institution, compelled to withdraw for unavoidable reasons. In such cases, two-thirds (2/3) of the student's tuition may be refunded if the student withdraws within ten (10) calendar days after the first day of classes as published in the school calendar. Tuition refunds will not be considered after that time. (Tuition refunds will not be considered for tuitions of five dollars ($5.00) or less, except if a course or curriculum fails to materialize, all the students' tuition shall be refunded.)

Where a student, having paid the required tuition and fees for a quarter, withdraws from the institution before the end of the quarter and the reasons for the withdrawal are found excusable by the institution's administration, the student may be allowed credit for unrefunded tuition and fees if he applies for re-admission during any of the next four calendar quarters and petitions in writing to be allowed such credit.

IS STUDENT FINANCIAL AID AVAILABLE?

Limited financial aid is available through gifts or loan funds provided by individuals or civic groups. This program is administered through the services of a Financial Aid Officer located in the Student Personnel Division.

The financial aid program is as follows:

1. **New Hanover Medical Society Loan Fund.**

This is a revolving loan fund established by the Medical Society for students in the Practical Nurse training program.

2. **East Wilmington Rotary Club Loan Fund.**

Loans are made to students recommended by the school. No interest is charged while the student is in school.

3. **Wilmington Jaycee's Scholarship Fund.**

The Jaycees have made available scholarships to be used for paying tuition. The extent of these scholarships are determined by the amount of funds available.

4. **Wilmington Chapter of the National Association of Women in Construction Scholarship.**

The Wilmington Chapter of Women in Construction makes available a scholarship to any student who is studying in a construction related curriculum. At the present time any student in either the Drafting Programs or Heating and Air Conditioning is eligible to apply for the scholarship. Selection of the scholarship recipient is made by the Financial Aid Officer. Eligibility for the scholarship is based on the following criteria: (1) appropriate curriculum, (2) financial need, (3) must show educational promise.

5. **Cape Fear Lion's Club Scholarship Fund.**

The Cape Fear Lion's Club makes available a novel idea in student aid in that a prospective student with a visual handicap or whose parents have a visual handicap will receive a scholarship to be used for paying tuition. The extent of this scholarship will be determined by the amount of funds available.

6. College Foundation.

The insured student loan program is administered in North Carolina by the College Foundation, Inc. through the State Education Assistance Authority. Participating North Carolina banks and life insurance companies provide for the student loans and these are available to any North Carolina student under terms and conditions set by College Foundation. Loans cover educational expenses for one year including tuition, books and activity fee plus any allowances for travel and living expenses. To be eligible for this loan, a student must be: (1) a full time student, (2) must be a legal resident of North Carolina, (3) must show and maintain good standings at this school.

7. National Direct Student Loan & Educational Opportunity Grant.

When funds are available the school participates in the National Direct Student Loan and the Educational Opportunity Grant Program. This program is administered by the Financial Aid Officer located in the Student Personnel section.

8. College Work Study.

The institute also participates in the College Work Study Program. This Work Study Program provides the students an opportunity to earn a portion of their college expenses by working up to 15 hours per week while in school during the regular academic year. Those interested in this program should contact the Financial Aid Officer located in the Student Personnel Division.

9. Vocational Rehabilitation.

Vocational Rehabilitation is a program operated through the Division of Vocational Rehabilitation in cooperation with the North Carolina Department of Public Instruction and the Federal Office of the Vocational Rehabilitation Administration. The Division is financed by State and Federal funds. Vocational Rehabilitation offers such services as are necessary to enable a physically or mentally employment-handicapped person to become self-supporting. Financial assistance is available for training at the Cape Fear Technical Institute for eligible handicapped persons.

If a prospective student has a physical disability or is limited in his activity because of a disability he should contact the Division of Vocational Rehabilitation office nearest him. The Division Office for Southeastern North Carolina is located at 717 Market Street.

10. "G. I. BILL" The Veterans Readjustment Benefits Act of 1966.

Most programs are being offered by the Institute at this time are approved for training under the so-called "Cold War G.I. Bill." Veterans desiring to train under the benefits of this bill must first establish their eligibility with the Veterans Administration. In gen-

eral, Veterans who served in the Armed Forces since January 31, 1955, and who were discharged under conditions other than dishonorable, qualify for training under the bill. The amount of training permitted is determined by the number of months of service. Certain servicemen on active duty are also eligible for schooling under this bill. Interested servicemen should contact their Education Officer.

FEDERAL PROGRAMS

The Technical Institute cooperates with various federal agencies which provide financial assistance to occupational education trainees. Full information about such programs, when they are available, may be obtained from the Student Personnel section of the Institute.

THE LIBRARY LEARNING RESOURCES CENTER

The Cape Fear Technical Institute Library Learning Resources Center is located on the second floor of the main building. The Center provides learning facilities for faculty and students, including a current collection of some 12,000 volumes, subscriptions to over 100 periodicals and newspapers, disc and tape recordings, microfilm, filmstrips, 35mm slides, 8mm film loops, 16mm films, and audio tape recordings. Now under construction are facilities for the production and presentation of film and video teaching units, as well as a complete woodworking shop for use by the faculty for the construction of teaching models.

From time to time, traveling exhibits of art and handicraft from the North Carolina Museum of Art, Raleigh, N. C., and the National Gallery of Art, Washington, D. C., as well as Cape Fear Technical Institute student workmanship are placed on display.

While the center, for the most part, relates to the trade and technical programs offered by Cape Fear Technical Institute, and is primarily for the students and faculty, residents of the area served by Cape Fear Technical Institute, and particularly industrial employees, are invited to make use of it.

COUNSELING SERVICES

Qualified counselors are available to assist students in selecting an appropriate course of study, to provide occupational and educational information and to discuss scholastic or personal problems which may arise.

GRADE POINT AVERAGES AND GRADING

Letter grades are used at Cape Fear Technical Institute in reporting grades to students; however, such terms as 3.2, 2.6, and 1.89

will be used. These are called "grade point averages," and are very important. They are earned on the following basis:

GRADE	Numerical Equivalency	Significance	Quality Points Per Quarter Hour
A	94-100	Superior	4
B	86-93	Good	3
C	78-85	Average	2
D	70-77	Poor	1
E	Below 70	Failure	0
I	Incomplete	Incomplete	0
WP		Withdrawal	0
WF		Withdrawal Failing	0

Incomplete Grades

Incomplete will be given only when circumstances justify additional time to complete the course. An incomplete must be removed within six weeks following the quarter it was received. Grades not made up within six weeks will be recorded as an "E".

Report cards are mailed to the student's home shortly after the end of each quarter.

What is a "Quarter Hour Credit"?

Each course listed is followed by a notation on the number of quarter hours it carries. Normally, the number of quarter hours earned is based on the number of class, laboratory or shop hours spent under the supervisor or the course instructor per week for the quarter.

Usually 1 quarter hour credit is given for each hour of class per week, for each two hours of laboratory work per week, or for each three hours of manipulative laboratory per week. Exceptions to this arrangement may be made in cases where specific classification is not feasible.

How are Grade-point averages computed?

For example, suppose grades for the Quarter are:

Subject	Grade	Qtr. Hours Credit
T ENG 102	94 or A	3
T MAT 102	87 or B	5
T BUS 120	76 or D	4
T ECO 104	83 or C	3
T BUS 115	78 or C	3
		18

The grade for each subject will be converted to a grade-point (see conversion in table above). Then the grade-point is multiplied by

the quarter hours. The result (Total quality points) is then divided by the total quarter hours credit to give the grade-point average. Example:

Class	Grade Point		Qtr. Hours Credit		Quality Points
T ENG 102	4	×	3	=	12
T MAT 102	3	×	5	=	15
T BUS 120	1	×	4	=	4
T ECO 104	2	×	3	=	6
T BUS 115	2	×	3	=	6
	TOTALS		18		43

Divide 43 ÷ 18 = 2.39

The grade point average is 2.39.

REQUIREMENTS FOR GRADUATION

To receive the Associate in Applied Science Degree, a student must maintain satisfactory grades in all laboratory and class subjects and an overall grade point average of 2.0.

To receive a diploma, a student must have a satisfactory passing grade in all shop work and related class subjects. Certificates are issued to those who pass less than the complete course of study.

GRADUATION WITH HONORS

Those members of the graduating class who have demonstrated outstanding leadership, attitude and ability will be graduated with honors. Scholarship is not the only factor in graduating with honors. Recipients of these awards are selected by Department Heads in Cooperation with appropriate faculty members.

SCHOLASTIC HONORS

Full-time students who have earned a grade point average of 3.0 with no grade lower than "C" will be placed on the Dean's List.

CONDUCT

Students will have but one conduct rule, i.e., to conduct themselves as ladies and gentlemen. This has reference to dress, speech and action. Area or classroom rules will be designated by instructors or supervisors and must be followed by all.

ATTENDANCE AND TARDINESS

Attendance:

1. The nature of the programs for students at CFTI is such that it is necessary that students be in regular attendance at all times.

2. Emergency Absences—A student may be absent from a class for emergency reasons one time for each quarter hour credit given for the course without affecting his grade. He will be responsible for making up any class assignments missed due to absence from class.

3. A student who accumulates more class absences than quarter hours credit for a course for the following emergency reasons must have their case reviewed by the Dean of Student Affairs and Admissions and Student Personnel Advisory Committee in order to be reinstated.

a. Illness or injury to the student.

b. Illness or death in the immediate family.

c. Inclement weather (hurricane, ice, etc.)

Tardiness:

1. A student is tardy if not in his classroom, lab, or shop when the tardy bell rings.

2. If a student accumulates three tardies in a class the instructor may count these tardies as one of the emergency absences.

3. A student who is fifteen or more minutes late for a class, or who leaves before the class is over without the instructor's permission, will be counted as having an emergency absence from that class.

4. Students will be informed as to the times alloted for breaks between class or lab at the beginning of the quarter; this time limit should be strictly followed to avert penalty.

DRESS

Where special dress or safety devices are required by the instructor, Department of Community College regulations, public law, Dean of Student Affairs, or the President, the student will be expected to conform. Shorts may not be worn to classes within the institute buildings and shoes must be worn at all times in the buildings and on the ships. Students are expected to maintain good personal grooming consistent with the ordinary requirements of industry. Male students will be required to have haircuts insuring meeting good sanitation and safety procedures.

PROBATION AND SUSPENSION

A student failing to make or maintain an accumulative grade point average of 1.5 during any quarter will be subject to academic probation for the following quarter. A probationary student who fails to raise his accumulative grade point average to 1.50 is sub-

ject to academic suspension or placement in a more appropriate program. A student suspended for poor scholarship must have his case reviewed by the Dean of Student Affairs and Admissions Committee before being re-admitted.

Any student whose conduct bcomes unsatisfactory will be placed on probation—any misconduct after a person is placed on probation will result in prompt suspension.

Absences of five or more consecutive days without notification to the Student Personnel Office will result in the student being dropped from the class roll. The student may be readmitted only by the Admissions and Student Personnel Advisory Committee through the Student Personnel Office.

RIGHT OF APPEAL

Any student who is dismissed from school for academic or disciplinary reasons may have his case reviewed by requesting such through the Dean of Student Affairs who in turn will bring his case before the administration. The appeal may be carried to the Board of Trustees at the student's request.

WITHDRAWAL

Students desiring to withdraw from school should contact the office of Student Personnel Services to obtain the necessary forms and procedures for official withdrawal. A student who fails to withdraw officially will receive a grade of "E" for each course in which enrolled.

In cases where former students desire to re-enter the school they must contact the Dean of Student Affairs who will review their records and present their application to the admissions committee for approval.

PLACEMENT

The Dean of Student Affairs and Staff at Cape Fear Technical Institute make every possible effort to assist students and graduates in securing positions in their chosen fields. Although the Institute cannot guarantee placement, contact is maintained with business and industry concerning employment opportunities for students at Cape Fear Technical Institute.

There is no charge to industry or students for this placement service.

NON-IMMIGRANT ALIEN STUDENTS

"This school is authorized under Federal law to enroll non-immigrant alien students."

STUDENT ACTIVITIES

Extra-curricular activities are a very important part of the total educational program at Cape Fear Technical Institute.

Among the intercollegiate activities offered are basketball, baseball, and golf.

The student government is a very active organization at this school. It is the voice of the student body and has paved the way for good lines of communication between the students and the administration.

The student newspaper and school annual are among the publications done by the students. Students interested in any aspect of such publications are encouraged to participate.

TECHNICAL DIVISION

TECHNICAL DIVISION

Technicians are among the fastest growing occupational groups in the United States. In recent years, the needs of an expanding and increasingly-technical economy have greatly intensified the demand not only for engineers and scientists, but also for the technical workers who assist them. Technicians are those workers whose jobs require both knowledge and use of scientific and mathematical theory; specialized education or training in some aspect of technology or science; and who, as a rule, work directly with scientists and engineers. Some jobs held by these technicians are supervisory and require both technical knowledge and the ability to supervise people.

In carrying out their assignments, engineering and science technicians frequently use complex electronic and mechanical instruments, experimental laboratory apparatus, and drafting instruments. These workers engage in virtually every aspect of engineering and scientific work. In research, development, and design work, they conduct experiments or tests; set up, calibrate, and operate instruments; and make calculations. They also assist scientists and engineers in developing experimental equipment and models by making drawings and sketches and frequently do some design work.

Technicians also work in jobs related to production and may aid in the various phases of production operations, such as working out specifications for materials and methods of manufacture, advising tests to insure quality control of products, or making time-and-motion studies (timing and analyzing the worker's movements) designed to improve the efficiency of a particular operation. They may also perform liaison work between engineering and production or other departments.

The Cape Fear Technical Institute provides training in a number of areas which require training beyond the high school but which do not require four years of college preparation. Most of the technical programs are eighteen months in length and are geared to train a person in specific technical areas. Students spend twenty to thirty hours per week in classroom and laboratory work; additional time will be needed for outside assignments.

Credit hours granted in the various technical programs are not transferable to other institutions except as an institution may determine that a particular course and credits are applicable to a curriculum offered by that school.

The associate in applied science degree is awarded to students who complete a technical program. To be eligible for the degree, a student must maintain satisfactory grades in all laboratory and class subjects and an overall grade point average of 2.0 Certificates are given to those who pass less than the whole course of study.

COURSES OFFERED

Business Administration

Chemical Operations Technology

Drafting & Design Technology

Electronics Technology

General Office Technology

Instrumentation Technology

Marine Electronics (Special Technology, one quarter only)

Marine Laboratory Technology

Marine Technology

Secretarial-Engineering and Technical

ADMISSION REQUIREMENTS

1. Must be at least eighteen years of age, or his high school class must have graduated.

2. Must be a high school graduate or equivalent*.

3. Must demonstrate aptitude for technician training as determined by standard tests. These tests will aid in student selection, placement, and guidance. Guidance and counseling will be available to the student throughout his education, not just at the time of his enrollment.

4. Must be in acceptable condition of physical and mental health.

5. A personal interview is required.

ADMISSION PROCEDURE

1. Submit completed application.

2. Have transcripts of all previous education mailed to the Institute.

3. Satisfy admission test requirement.

4. Come to the school for a personal interview and additional testing when asked to do so.

5. Submit medical form to the Institute.

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*See page 144 in General Adult Education Section of this catalogue for details about the high schol equivalency certificate.

BUSINESS ADMINISTRATION

In North Carolina the opportunities in business are increasing. With the increasing population and industrial development in this State, business has become more competitive and automated. Better opportunities in business will be filled by students with specialized education beyond the high school level. The Business Administration Curriculum is designed to prepare the student for employment in one of many occupations common to business. Training is aimed at preparing the student in many phases of administrative work that might be encountered in the average business.

The specific objectives of the Business Administration Curriculum are to develop the following competencies:

1. Understanding of the principles of organization and management in business operations.

2. Understanding our economy through study and analysis of the role of production and marketing.

3. Knowledge in specific elements of accounting, finance, and business law.

4. Understanding and skill in effective communication for business.

5. Knowledge of human relations as they apply to successful business operations in a rapidly expanding economy.

The graduate of the Business Administration Curriculum may enter a variety of career opportunities from beginning sales person or office clerk to manager trainee. The duties and responsibilities of this graduate vary in different firms. These encompassments might include: making up and filing reports, tabulating and posting data in various books, sending out bills, checking calculations, adjusting complaints, operating various office machines, and assisting managers in supervising. Positions are available in businesses such as advertising; banking; credit; finance; retailing; wholesaling; hotel, tourist, and travel industry; insurance; transportation; and communications.

BUSINESS ADMINISTRATION

		Hours Per Week		Quarter Hours
FIRST QUARTER		**Class**	**Lab**	**Credit**
T-ENG	101-C—Grammar and Composition	3	2	4
T-BUS	102—Typewriting (or Elective	2	3	3
T-MAT	110—Business Mathematics	5	0	5
T-BUS	101—Introduction to Business	5	0	5
T-ECO	102—Economics	3	0	3
		18	5	20
SECOND QUARTER				
T-ENG	102-C—Grammar and Composition	3	2	4
T-BUS	120—Accounting	5	2	6
T-ECO	104—Economics	3	0	3
T-BUS	103—Typewriting	2	3	3
T-BUS	115-C—Business Law	5	0	5
		18	7	21
THIRD QUARTER				
T-ENG	206—Business Communication	3	0	3
T-BUS	110-C—Office Machines	3	2	4
T-BUS	121—Accounting	5	2	6
T-BUS	116-C—Business Law	5	0	5
T-BUS	104—Typewriting	2	3	3
		18	7	21
FOURTH QUARTER				
T-ENG	204—Oral Communication	3	0	3
T-EDP	104—Introduction to Data Processing Systems	3	2	4
T-BUS	122—Accounting	5	2	6
T-BUS	243—Advertising	3	2	4
T-PSY	206—Applied Psychology	3	0	3
		17	6	20

FIFTH QUARTER

T-ENG	205—Advanced Grammar	3	2	4
T-BUS	123-C—Business Finance	3	2	4
T-BUS	232-C—Sales Development	3	2	4
T-BUS	229—Taxes	3	2	4
T-SOC	102—Principles of Sociology	3	0	3
		15	8	19

SIXTH QUARTER

T-BUS	124-C—Business Finance	3	2	4
T-BUS	220—Managerial Accounting	3	2	4
T-BUS	239—Marketing	5	0	5
T-BUS	272-C—Office Management and Supervision	3	2	4
T-SOC	206—American Institutions	3	0	3
		17	6	20

BUSINESS ADMINISTRATION

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101-C—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.

Prerequisite: None

T-Bus 102—Typewriting: Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts.

Prerequisite: None

T-Mat 110—Business Mathematics: This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, taxes, and pertinent uses of mathematics in the field of business.

Prerequisite: None

T-Bus 101—Introduction to Business: A survey of the business world with particular attention devoted to the structure of the various types of business organization, methods of financing, internal organization, and management.

Prerequisite: None

T-Eco 102—Economics: The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.

Prerequisite: None

SECOND QUARTER

T-Eng 102-C—Grammar and Composition: A continuation of T-Eng 101-C, grammar and composition with emphasis on self-expression in business communications.

Prerequisite: T-Eng 101-C

T-Bus 120—Accounting: Principles, techniques and tools of accounting, for understanding of the mechanics of accounting. Collecting, summarizing, analyzing, and reporting information about service and mercantile enterprises, to include practical application of the principles learned.
Prerequisite: T-Mat 110

T-Eco 104—Economics: Greater depth in principles of economics, including a penetration into the composition and pricing of national output, distribution of income, international trade and finance, and current economic problems.
Prerequisite: T-Eco 102

T-Bus 103—Typewriting: Instruction emphasizes the development of speed and accuracy with further mastery of correct typewriting techniques. These skills and techniques are applied in tabulation, manuscript, correspondence, and business forms.
Prerequisite: T-Bus 102 or the equivalent. Minimum speed required, 15 words per minute for 3 minutes with six errors allowed.

T-Bus 115-C—Business Law: A general course designed to acquaint the student with certain fundamentals and principles of business law, including contracts, negotiable instruments, and agencies.
Prerequisite: None

THIRD QUARTER

T-Eng 206—Business Communication: Develops skills in techniques in writing business communications. Emphasis is placed on writing action — getting sales letters and prospectuses. Business reports, summaries of business conferences, letters involving credit, collections, adjustments, complaints, orders, acknowledgments, remittances, and inquiry.
Prerequisite: T-Eng 102-C

T-Bus 110-C—Office Machines: A general survey of the business and office machines. Students will receive training in techniques, processes, operation and application of the ten-key adding machine, full keyboard adding machines, and calculator.
Prerequisite: None

T-Bus 121—Accounting: Partnership and corporation accounting including a study of payrolls, federal and state taxes. Emphasis is placed on the recording, summarizing and interpreting data for management control rather than on bookkeeping skills. Accounting services are shown as they contribute to the recognition and solution of management problems.
Prerequisite: T-Bus 120

T-Bus 116-C—Business Law: Includes the study of laws pertaining to bailments, sales, riskbearing, partnership-corporation, mortgages, and property rights.
Prerequisite: T-Bus 115-C

T-Bus 104—Typewriting: Emphasis on production typing problems and speed building. Attention to the development of the student's ability to function as an expert typist, producing mailable copies. The production units are tabulation, manuscript, correspondence, and business forms.
Prerequisite: T-Bus 103 or the equivalent. Minimum speed requirement, 25 words per minute for 5 minutes with five errors allowed.

FOURTH QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits

and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Edp 104—Introduction to Data Processing Systems: Fundamental concepts and operational principles of data processing systems, as an aid in developing a basic knowledge of computers, prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses.
Prerequisite: None

T-Bus 122—Accounting: Advanced practice problems in accounting. Emphasis on detailed and accurate interpretation of data for management.
Prerequisite: T-Bus 121

T-Bus 243—Advertising: The role of advertising in a free economy and its place in the media of mass communications. A study of advertising appeals; product and market research; selection of media; means of testing effectiveness of advertising. Theory and practice of writing advertising copy for various media.
Prerequisite: None

T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None

FIFTH QUARTER

T-Eng 205—Advanced Grammar: Close and detailed examination of usage from the word level to the total composition level, with emphasis on not merely the correcting of errors but on the upgrading of the student's ability to think and reason why correction of errors and improvements in usage are necessary and on his ability to compose good examples to illustrate the principles under study.
Prerequisite: None

T-Bus 123-C—Business Finance: Financing of business units, as individuals, partnerships, corporations, and trusts. A detailed study is made of short-term, long-term, and consumer financing.
Prerequisite: None

T-Bus 232-C—Sales Development: A study of retail, wholesale and specialty selling. Emphasis is placed upon mastering and applying the fundamentals of selling. Preparation for and execution of sales demonstrations required.
Prerequisite: None

T-Bus 229—Taxes: Application of federal and state taxes to various businesses and business conditions. A study of the following taxes: income, payroll, intangible, capital gain, sales and use, excise, and inheritance.
Prerequisite: T-Bus 121

T-Soc 102—Principles of Sociology: An introductory course in the principles of sociology. An attempt to provide an understanding of culture, collective behavior, community life, social institutions and social change. Presents the scientific study of man's behavior in relation to other men, the general laws affecting the organization of such relationships and the effect of social life on human personality and behavior.
Prerequisite: None

SIXTH QUARTER

T-Bus 124-C—Business Finance: Financing, federal, state, and local governments and the ensuing effects upon the economy. Factors affecting supply of funds, monetary and credit policies.
Prerequisite: T-Bus 123-C

T-Bus 220—Managerial Accounting: Emphasizes the analysis of accounting data. Accounting data are evaluated as to usefulness in predicting the risks involved in management decisions. Problem situations that require the analysis of the effectiveness of accounting information get the student totally involved wih major management concepts.
Prerequisite: T-Bus 121

T-Bus 239—Marketing: A study of the marketing structure within the framework of the U. S. economic system. It includes the study of the movement of goods from producer to consumer through various channels of distribution, the functions of marketing, the social and economic implications.
Prerequisite: None

T-Bus 272-C—Office Management and Supervision: Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.
Prerequisite: None

T-Soc 206—American Institutions: A study of the effect of American social, economic, political, religious, and educational institutions upon the individual in his role as a citizen and a worker. The course dwells upon current local, national, and global problems in the light of our political and economic heritage.
Prerequisite: None

CHEMICAL OPERATIONS TECHNOLOGY

THE CHEMICAL OPERATIONS TECHNICIAN PROGRAM

The new approach to the training of students for employment in Chemical Industries consists of two parts. The first part is strongly plant oriented and the student may be graduated at the end of four full quarters of instruction as a Chemical Operator. If the student has the desire to become a laboratory technician—control, quality or research, he may continue in the curriculum for an additional three quarters that are laboratory oriented.

There is a definite need for both types of graduates. Some people are laboratory oriented and enjoy this type of work. Others are interested in the actual production of chemicals and products. This new course provides adequate training for both without subjecting the student that does not want a srong laboratory course to this phase of the curriculum.

CHEMICAL OPERATIONS TECHNOLOGY

	Hours Per Week		Quarter Hours
FIRST QUARTER	**Class**	**Lab**	**Credit**
T-CHM 114—Basic Chemical Concepts	5	6	7
T-PHY 100—Basic Physics	5	2	6
T-MAT 104—Basic Mathematics	5	0	5
T-ENG 101—Grammar and Composition	3	0	3
	18	8	21
SECOND QUARTER			
T-CHM 115—Industrial Chemistry	5	6	7
T-PHY 105—Physics: Heat and Fluids	5	0	5
T-MAT 105—Basic Mathematics (Simple Algebra)	5	0	5
T-MEC 106—Process Instrumentation	0	3	1
T-ENG 102—Grammar & Composition	3	0	3
	18	9	21
THIRD QUARTER			
T-CHM 116—Industrial Chemistry	5	6	7
T-MEC 235-C—Hydraulics and Pneumatics	3	3	4
T-CHM 150—Industrial Operations	3	0	3
T-MAT 107—Industrial Calculations	3	0	3
T-ENG 103—Report Writing	3	0	3
	17	9	20
FOURTH QUARTER			
T-CHM 117—Pilot Plant	0	20	7
T-CHM 151—Industrial Operations	3	0	3
T-ISC 201—Industrial Organization & Management	3	0	3
T-ENG 204—Oral Communication	3	0	3
	9	20	16
FIFTH QUARTER			
T-CHM 243—Analytical Chemistry	3	9	6
T-CHM 230—Organic Chemistry	3	6	5
T-MAT 108—Calculator Operations	3	0	3
T-PSY 206—Applied Psychology	3	0	3
	12	15	17
SIXTH QUARTER			
T-CHM 244—Analytical Chemistry	2	9	5
T-CHM 210-C—Organic Chemistry	3	6	5
T-MEC 210-C—Metallurgy, Physical	3	0	3
T-SOC 102—Principles of Sociology	3	0	3
	11	15	16
SEVENTH QUARTER			
T-CHM 245—Analytical Chemistry	2	9	5
T-CHM 232-C—Organic Chemistry	3	6	5
T-PHY 103—Physics: Electricity	3	2	4
T-SOC 206—American Institutions	3	0	3
	11	17	17

CHEMICAL OPERATIONS TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Chm 114—Basic Chemical Concepts: The student is introduced to some of the basic concepts of chemistry; to the elements in general; to physical properties of elements and compounds; to generalized chemical reactions; the major differences between organic and inorganic chemicals with respect to bonding are discussed.
Prerequisite: None

T-Phy 100—Basic Physics: The student learns some of the more common conversion factors for changing the English system to the metric system. The principles of simple machines and mechanics are presented. Measurement and the instruments used are discussed.
Prerequisite: None

T-Mat 104—Basic Mathematics: A general review of arithmetic with emphasis on decimals, fractions and percent. A thorough coverage of ratio and proportion.
Prerequisite:: None

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequisite: None

SECOND QUARTER

T-Chm 115—Industrial Chemistry: Several well known processes for the production of chemical products will be studied in detail. The student will learn why chemicals are used to produce specific results; how they are handled; and some of the ways reactions may be controlled.
Prerequisite: T-Chm 114

T-Phy 105—Physics: Heat and Fluids: The importance of heat will be stressed. The various temperature scales will be covered and various instruments used for the determination of temperature will be operated in the laboratory. The general principles of heat transfer will be discussed. The effects of heat on density, boiling point, vapor pressure, viscosity and surface tension of fluids will be investigated.
Prerequisite: T-Phy 100

T-Mat 105—Basic Mathematics: The application of simple algebra to the solving of practical problems is the main objective of this course. The student will learn to use mathematical tables and how to construct and read graphs. Use of conversion factors and scientific notation will be used throughout the course.
Prerequisite: T-Mat 104

T-Mec 106—Process Instrumentation: This is a laboratory course in which the student works with industrial types of instruments that control the flow of fluids in indusrial operations.
Prerequisite: None

T-Eng 102—Grammar & Composition: A continuation of T-Eng 101, Grammar & Composition with emphasis on self-expression in business communication.
Prerequisite: T-Eng 101

THIRD QUARTER

T-Chm 116—Industrial Chemistry: The student learns to read flow sheets of chemical processes. Common problems will be discussed and details given for correction of the problem. How preventive maintenance can make an operator's job easier to live with will be discussed. The student will learn the importance of safety rules and regulations.
Prerequisite: T-Chm 115

T-Mec 235-C—Hydraulics and Pneumatics: In this course the student will learn the basic ideas of hydraulic and pneumatic systems. In so doing the student will develop an understanding of various hydraulic and pneumatic controls and their relationships and function in circuits. Symbols and conventional practices will be stressed.
Prerequisite: T-Phy 105

T-Chm 150—Industrial Operations: The student learns about the design and operation of various standard pieces of equipment used in the chemical industry. The use of various materials of construction will be discussed in each case.
Prerequisite: None

T-Mat 107—Industrial Calculations: The mathematical solution of problems the operator will have to make is thoroughly covered.
Prerequisites: T-Mat 104 and 105

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

FOURTH QUARTER

T-Chm 117—Pilot Plant: The student will operate industrial type equipment, take samples, record data and perform any other duties normally connected with a unit operation. He will be given detailed instructions that must be read, understood and followed. He will assist in the assembly of equipment and any repair work that needs to be done "on the job."
Prerequisites: All previous Chemistry, Physics and Mathematics courses

T-Chm 151—Industrial Operations: This is a continuation of the course started in the third quarter.
Prerequisite: T-Chm 150

T-Isc 201—Industrial Organization and Management: Organizational structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

FIFTH QUARTER

T-Chm 243—Analytical Chemistry: The student will learn to follow analytical procedures involving acid-base reactions, oxidation reduction reactions utilizing volumetric and gravimetric methods. Industrial type instruments will be used where applicable. The principles of qualitative and quantitative analysis will be combined for the isolation, identification and percentage determination of various mixtures. The determination of physical constants will be thoroughly used.
Prerequisites: T-Chm 114; T-Mat 104-105

T-Chm 230—Organic Chemistry: The student will study the various families of carbon chemistry from the simplest alkane to rather complex polymerization products. He will learn how organic compounds are prepared and some of the specialized reactions that the various groups undergo. Laboratory work will acquaint the student with a number of naturally occurring chemicals. Preparation of derivatives and specialized tests will be used for identification purposes.
Prerequisite: T-Chm 114

T-Mat 108—Calculator Operations: Various types of calculators are used to instruct the student in what type of calculations may be performed.
Prerequisites: T-Mat 105 and 107

T-Psy 206—Applied psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principle of mental hygiene to his adjustment problems as a workers and a member of the general community.
Prerequisite: None

SIXTH QUARTER

T-Chm 244—Analytical Chemistry: This is a continuation of the course started in the fifth quarter.
Prerequisite: T-Chm 243

T-Chm 231-C—Organic Chemistry: This is a continuation of the course started in the fifth quarter.
Prerequisite: T-Chm 230

T-Mec 210-C—Physical Metallurgy: This is an introductory course covering the more common metallic elements as to their physical properties, their industrial uses and how their properties are altered when they are alloyed.
Prerequisite: T-Chm 114

T-Soc 102—Principles of Sociology: An introductory course in the principles of sociology. An attempt to provide an understanding of culture, collective behavior, community life, social institutions and social change. Presents the scientific study of man's behavior in relation to other men, the general laws affecting the organization of such relationships and the effects of social life on human personality and behavior.
Prerequisite: None

SEVENTH QUARTER

T-Chm 245—Analytical Chemistry: This is a continuation of the course started in the sixth quarter.
Prerequisite: T-Chm 244

T-Chm 232-C—Organic Chemistry: This is a continuation of T-Chm 231-C, the course started in the fifth quarter.
Prerequisite: T-Chm 231-C

T-Phy 103—Physics: Electricity: Basic theories of electricity, methods of production, and transmission and transforming of electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course.
Prerequisites: T-Mat 104-105; T-Phy 100

T-Soc 206—American Institutions: A study of the effect of American social, economic, political, religious, and educational institutions upon the individual in his role as a citizen and a worker. The course dwells upon current local, national, and global problems in the light of our political and economic heritage.
Prerequisite: None

DRAFTING & DESIGN — MECHANICAL

This curriculum description was prepared for the purpose of outlining a training program for students of mechanical drafting and design technology. There are certain identifiable duties which are common to all technicians of this general classification and which comprise the basic areas of technical knowledge they need. This curriculum has been designed for training persons in the accepted performance of these basic duties that will be assigned, and to enable the individual student to become proficient in a short time after he becomes employed in the industry.

Courses in general education have been included to give a student the assurance and understanding that comes with education upon a broad base. The technician associates with many levels of thought and expression — administrative, personnel, scientists, engineers, skilled workmen—and must be able to communicate effectively with all levels. Courses containing essential information from related subject areas, such as mathematics, physics, and mechanics have been included in order to provide the student a better academic base for his training. Emphasis is placed upon ability to think and plan, as well as drafting procedures and techniques.

Mechanical drafting and design technicians are concerned with the preparation of drawings for design proposals, for experimental models and items for production for use.

These technicians perform many aspects of drafting in a specialized field, such as the developing of the drawing of a section, subassembly or major component. Investigating design factors and availability of material and equipment, production methods and facilities are frequent assignments. They assist in the design of existing units and reports on functional performance. They may draw components in industrial fields based on engineers' original design concepts or specific ideas. Also, they may be assigned as coordinators for the execution of related work or other design, production, tooling, material and planning groups. Technicians with experience in this classification may often supervise the preparation of working drawings.

These technicians are employed in many types of manufacturing, fabrication, research development and service industries. Substantial numbers also are employed in communications, transportation, public utilities, consulting engineering firms, and federal, state, and local governments.

DRAFTING & DESIGN — MECHANICAL

		Hours Per Week		Quarter Hours
FIRST QUARTER		**Class**	**Lab**	**Credit**
T-ENG	101—Grammar and Composition	3	0	3
T-MAT	101-C—Technical Mathematics	5	0	5
T-DFT	101-C—Technical Drafting	3	9	6
T-PSY	206—Applied Psychology	3	0	3
		14	9	17
SECOND QUARTER				
T-ENG	102—Grammar and Composition	3	0	3
T-MAT	102-C—Technical Mathematics	5	0	5
T-DFT	102-C—Technical Drafting	0	9	3
T-BUS	102—Typewriting	2	3	3
T-SOC	102—Principles of Sociology	3	0	3
		13	12	17
THIRD QUARTER				
T-ENG	204—Oral Communication	3	0	3
T-MAT	103-C—Technical Mathematics	5	0	5
T-PHY	101—Physics: Properties of Matter	3	2	4
T-DFT	103—Technical Drafting	0	6	2
T-SOC	206—American Institutions	3	0	3
T-MAT	109—Slide Rule	3	0	3
		17	8	20
FOURTH QUARTER				
T-ENG	103—Report Writing	3	0	3
T-DFT	201—Technical Drafting	3	6	4
T-PHY	102—Physics: Work, Energy, Power	3	2	4
T-MEC	216—Industrial Materials	5	0	5
T-MEC	101—Machine Processes	0	4	2
		13	12	18

FIFTH QUARTER

T-DFT	205—Design Drafting I	2	6	4
T-PHY	106—Applied Mechanics	3	3	4
T-MEC	209-C—Introduction to Metallurgy	5	0	5
T-WLD	101—Welding	0	3	1
T-MEC	102—Machine Processes	0	4	2
		10	16	16

SIXTH QUARTER

T-DFT	206—Design Drafting II	4	9	7
T-MEC	235—Hydraulics and Pneumatics	3	3	4
T-DFT	211—Mechanisms	3	2	4
T-MEC	205—Strength of Materials	2	0	2
		12	14	17

DRAFTING & DESIGN MECHANICAL

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.

Prerequisite: None

T-Mat 101-C—Technical Mathematics: The general area of basic mathematical concepts is presented, including common and decimal fractions, squares and square roots. The essential elements of algebra are also presented, including: positive and negative numbers, algebraic terminology, polynomials, exponents, scientific notation and powers of 10, grouping symbols, first degree and literal equations. Use of the slide rule is introduced at the beginning of this course. The application of principles learned is stressed in practical problems.

Prerequisite: None

T-Dft 101-C—Technical Drafting: The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand orthographic and pictorial sketching, geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning. The principles of isometric drawings are introduced. Problems involving points, lines, and planes shall be studied.

Prerequisite: None

T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.

Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102-C—Technical Mathematics: This is a continuation of T-Mat 101-C. Numerical trigonometry is introduced in this course and includes right triangles and radian measure of angles. A working knowledge of numerical computations is acquired, utilizing logarithms in conjunction with the slide rule. Linear graphs, simultaneous equations and determinants are also introduced.
Prerequisite: T-Mat 101-C

T-Dft 102-C—Technical Drafting: Intersection and developments and their practical solutions. Where applicable, model solutions accompany the problems. Architectural drawing will be introduced.
Prerequisite: T-Dft 101-C

T-Bus 102—Typewriting: Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts.
Prerequisite: None

T-Soc 102—Principles of Sociology: An introductory course in the principles of sociology. An attempt to provide an understanding of culture, collective behavior, community life, social institutions and social change. Presents the scientific study of man's behavior in relation to other men, the general laws affecting the organization of such relationships and the effects of social life on human personality and behavior.
Prerequisite: None

THIRD QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Mat 103-C—Technical Mathematics: This is a continuation of T-Mat 102-C. More advanced algebraic subjects are presented, including: Special products, factoring, algebraic fractions, exponents and radicals, vector and phasor algebra, quadratic equations, graphs of quadratics, maximum and minimum, and imaginary numbers. Measurements and computations involving areas and volumes of regular figures and solids are introduced as well as trigonometric functions of oblique triangles.
Prerequisite: T-Mat 102-C

T-Phy 101—Physics: Properties of Matter: A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: T-Mat 102-C

T-Dft 103—Technical Drafting: The application of orthographic projection principles to the more complex drafting problems, primary and secondary auxiliary views, simple and successive revolutions, and sections and conventions will be studied. Dimensioning practices for "details" and "working drawings," approved by the American Standards Association will also be included. Screws, screw threads, springs, keys, rivets will be covered.
Prerequisite: T-Dft 102-C

T-Soc 206—American Institutions: A study of the effect of American social, economic, political, religious, and educational institutions upon the individual in his role as a citizen and a worker. The course dwells upon current local, national, and global problems in the light of our political and economic heritage.
Prerequisite: None

T-Mat 109—Slide Rule: An introductory slide rule course starting with multiplication and division going into more complicated mathematics. Students will also master the use of a slide rule in calculating squares and square roots, reciprocals and trigonometric functions.
Prerequisite: None

FOURTH QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Dft 201—Technical Drafting: Basic mechanisms of motion transfer, gears and cams, will be studied and drawn with emphasis on methods of specifying, calculating, dimensions, and delineating.
Prerequisite: T-Dft 103

T-Phy 102—Physics: Work, Energy, Power: Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisites: T-Phy 101, T-Mat 103-C

T-Mec 216—Industrial Materials: Proper knowledge of all types of industrial materials is essential to successful decision-making and problem solving. This introductory course investigates the basic materials in industry. Electrical and physical properties of materials, mechanical characteristics of materials, water and steam, industrial gases, ceramic materials, cements and concretes, and metals are studied.
Prerequisite: None

T-Mec 101—Machine Processes: An introductory course designed to acquaint the student with basic hand tools, safety procedures and machine processes of modern industry. It will include a study of measuring instruments, characteristics of metals and cutting tools. The student will become familiar with the lathe family of machine tools by performing selected operations such as turning, facing, threading, drilling, boring, and reaming.
Prerequisite: None

FIFTH QUARTER

T-Dft 205—Design Drafting I: Basic design is introduced in the study of motion transfer mechanisms as they relate to power trains. Principles of design, sketching, design drawing, layout drafting, detailing from layouts, production drawings and simplified drafting practices constitute areas of study. Types and methods of specifying materials and workmanship are an integral part of the course.
Prerequisites: T-Mat 102, T-Phy 102

T-Phy 106—Applied Mechanics: Concepts and principles of statics and dynamics. Parallel concurrent and noncurrent force systems in coplanar and non-

coplanar situations. Concepts of centroids and center of gravity, moments of inertia, fundamentals of kinetics, and kinematics of velocity and motion.
Prerequisites: T-Mat 103-C, T-Phy 102

T-Mec 209-C—Introduction to Metallurgy. An introductory course investigating the properties of ferrous and non-ferrous metals and the tests to determine their uses. Production of iron and steel, shaping and forming, physical metallurgy of ferrous metals, heat treatments of steel, surface treatments, alloys of steel, and cast iron will be topics for study. Non-ferrous metals such as bearings metals (lead, brass, bronze), light metals (aluminum and magnesium), and copper and its alloys will be studied.
Prerequisite: None

T-Wld 101—Welding: Familiarization with the various Welding techniques and processes will be taught. These will include Oxyacetylene Welding, Arc Welding, Mig Welding, and Tig Welding.
Prerequisite: None

T-Mec 102—Machine Processes: Advanced operations on lathe, drilling, boring and reaming machines. Milling machine theory and practice. Thorough study of the types of milling machines, cutters, jig and fixtures devices, and the accessories used in a modern industrial plant. Safety in the operational shop is stressed.
Prerequisite: T-Mec 101

SIXTH QUARTER

T-Dft 206—Design Drafting II: Research to solve a problem in design by consulting various manuals, periodicals, and through laboratory experiments. A written technical report, preliminary design sketches, layout drawings, detail drawings, assembly and sub-assembly drawings, pictorial drawings, exploded pictorial assembly, patent drawings and specifications are required as a part of the problem
Prerequisite: T-Dft 205

T-Mec 235—Hydraulics and Pneumatics: The basic theories of hydraulic and pneumatic systems. Combinations of systems in various circuits. Basic design and functions of circuits and motors, controls, electrohydraulic servomechanisms, plumbing, filtration, accumulators and reservoirs.
Prerequisite: T-Phy 102

T-Dft 211—Mechanisms: Mathematical and drafting room solutions of problems involving the principles of machine elements. Study of motions of linkages, velocities and acceleration of points within a link mechanism; layout methods for designing cams, belt, pulleys, gears and gear trains.
Prerequisites: T-Dft 201, T-Mat 102-C, T-Phy 106

T-Mec 205—Strength of Materials: Instruction to the principles and analysis of stresses which occur within machine and structure elements subjected to various types of loads such as static, impact, varying and dynamic. Discussions of these stresses are made as applied to thin-walled cylinders and spheres, riveted and welded joints, beams, columns and machine components.
Prerequisites: T-Phy 106, T-Mat 103-C

ELECTRONICS TECHNOLOGY

The field of electronics has developed at a rapid pace since the turn of the century. For many years the major concern of electronics was in the area of communications. Developments during World War II and in the period since have revolutionized production techniques. New industries have been established to supplement the need and demand for electronics equipment.

Many opportunities exist for men and women with a technical education in electronics. This curriculum provides a basic background in electronic related theory with practical applications of electronics for business and industry. Courses are designed to develop competent electronics technicians who may take their place as an assistant to an engineer, or as a liaison between the engineer and the skilled craftsman.

The electronics technician may start in one or more of the following areas: research, design, development, production, maintenance or sales. He may be an assistant to an engineer, an engineering aide, laboratory technician, supervisor or equipment specialist. His trainng is similar to that of an engineer, but in less depth and more practical in application.

ELECTRONICS TECHNOLOGY

		Hours Per Week		Quarter Hours
FIRST QUARTER		**Class**	**Lab**	**Credit**
T-ENG	101—Grammar and Composition	3	0	3
T-MAT	101-C—Technical Mathematics	5	0	5
T-MAT	111—Applied Mathematics for Electronics	5	0	5
T-ELC	107—Electricity I	4	2	5
T-ELN	106—Electronics I (Instrument Familiarization)	2	6	4
		19	8	22
SECOND QUARTER				
T-ENG	102—Grammar and Composition	3	0	3
T-MAT	102-C—Technical Mathematics	5	0	5
T-MAT	112—Applied Mathematics for Electronics	3	0	3
T-ELC	108—Electricity II	4	2	5
T-ELN	107—Electronics II (Semiconductor Diodes & Vacuum Tubes)	5	6	7
		20	8	23
THIRD QUARTER				
T-ENG	103—Report Writing	3	0	3
T-MAT	103-C—Technical Mathematics	5	0	5
T-MAT	113—Applied Mathematics for Electronics	3	0	3
T-ELC	109—Electricity III	4	2	5
T-ELN	108—Electronics III (Transistors)	4	3	5
T-DFT	101—Technical Drafting	1	3	2
		20	8	23
FOURTH QUARTER				
T-BUS	102—Typewriting	2	3	3
T-ELN	205—Applications of Vacuum Tubes & Transistors	3	3	4
T-ELN	229—Electronic Project	3	3	4
T-PSY	206—Applied Psychology	3	0	3
T-ELN	213—Pulse Circuit Analysis	2	3	3
		13	12	17
FIFTH QUARTER				
T-ENG	204—Oral Communication	3	0	3
T-ELN	232—F. C. C. License Preparation	3	0	3
T-SOC	102—Principles of Sociology	3	0	3
T-ELN	241—Digital Principles and Applications	4	6	6
T-ELN	230—Electronic Project	2	6	4
		15	12	19
SIXTH QUARTER				
T-ELN	233—F. C. C. Second Class License Preparation	4	0	4
T-ELN	231—Electronic Project	3	6	5
T-ELN	220—Electronic Systems	6	0	6
T-SOC	206—American Institutions	3	0	3
T-BUS	272—Principles of Supervision	3	0	3
		19	6	21

ELECTRONICS TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammer and written composition in their day to day situations.
Prerequisite: None

T-Mat 101-C—Technical Mathematics: The general area of basic mathematical concepts is presented, including common and decimal fractions, squares and square roots. The essential elements of algebra are also presented, including: positive and negative numbers, algebraic terminology, polynomials, exponents, scientific notation and powers of 10, grouping symbols, first degree and literal equations. Use of the slide rule is introduced at the beginning of this course. The application of principles learned is stressed in practical problems.
Prerequisite: None

T-Mat 111—Applied Mathematics for Electronics: Designed to aid the student by mathematical applications of the basic and principles of electricity. Scientific notation, units and dimensions, and Ohm's Law regarding series and parallel DC circuits are studied.
Prerequisite: None

T-Elc 107—Electricity I: Introduction to basic theories and principles of electricity. Electrostatics, basic electric units, symbols, Ohm's Law, basic DC circuits, power, DC sources, and complex circuits are major parts of the course. Practical applications are stressed.
Prerequisite: None

T-Eln 106—Electronics I: Instrument familiarization. Functional use of the various test instruments used in the Electronics and Instrumentation fields.
Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102-C—Technical Mathematics: This is a continuation of T-Mat 101-C. Numerical trigonometry is introduced in this course and includes right triangles and radian measure of angles. A working knowledge of numerical computations is acquired, utilizing logarithms in conjunction with the slide rule. Linear graphs, simultaneous equations and determinants are also introduced.
Prerequisite: T-Mat 101-C

T-Mat 112—Applied Mathematics for Electronics: This is a continuation of T-Mat 111. Mathematical applications are made to the study of resistivity, multipliers, alternating currents, induction, reactance, impedance, phase relations, and transformers.
Prerequisite: T-Mat 111 or Equivalent

T-Elc 108—Electricity II: A continuation of T-Elc 107. Introduction to meters, magnetism, alternating current theory covering simple generators, sine wave analysis, induction, reactance, impedance, phase relations, and transformers. Practical applications are stressed.
Prerequisite: T-Elc 107 or Equivalent

T-Eln 107—Electronics II: A study of semiconductor diodes, including tunnel diodes, zener diodes, and light emitting diodes, also vacuum tube characteristics, circuit parameters of basic amplifiers. Filter circuits, RL, RC and RLC.
Prerequsites: T-Elc 107 and T-Eln 106

THIRD QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Mat 103-C—Technical Mathematics: This is a continuation of T-Mat 102-C. More advanced algebraic subjects are presented, including: Special products, factoring, algebraic fractions, exponents and radicals, vector and phasor algebra, quadratic equations, graphs of quadratics, maximum and minimum, and imaginary numbers. Measurements and computations involving areas and volumes of regular figures and solids are introduced as well as trigonometric functions of oblique triangles.
Prerequisite: T-Mat 102-C

T-Mat 113—Applied Mathematics for Electronics: This is a continuation of T-Mat 112. Mathematical Applications are made to the study of capacitance, complex RCL circuits, resonance, filters and multiphase power.
Prerequisite: T-Mat 112 or Equivalent

T-Elc 109—Electricity III: A continuation of T-Elc 108. Introduction to capacitance, complex RCL circuits, resonance, filters and multiphase power. Practical applications are stressed.
Prerequisite: T-Elc 108 or Equivalent

T-Eln 108—Electronics III: Theory & Applications of Transistor Circuits, Biasing, class of amplifiers, oscillators, multi-vibrators, coupling, push-pull and push-push amplifiers, and miscellaneous applications will be studied. Continued study of transducer theory and application.
Prerequisite: T-Elc 107

T-Dft 101—Technical Drafting: The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand orthographic and pictorial sketching, geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning.
Prerequisite: None

FOURTH QUARTER

T-Bus 102—Typewriting: Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts.
Prerequisite: None

T-Eln 205—Applications of Vacuum Tubes and Transistors: Practical applications of vacuum tubes and transistors to basic audio amplifiers, radio frequency amplifiers, detectors, modulators and oscillators.
Prerequisite: None

T-Eln 229—Electronic Project: Construction, wiring and testing of functional electronic equipment. Develops wiring and trouble-shooting techniques. Selection to be approved by instructor.
Prerequisite: None

T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular refer-

ence to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None

T-Eln 213—Pulse Circuit Analysis: The study of wave-shaping circuits and their applications with emphasis on computer usage.
Prerequisite: None

FIFTH QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducing meetings, conferences and interviews.
Prerequisite: None

T-Eln 232—F.C.C. License Preparation (Laws and Regulations): A study of F.C.C. laws and regulations pertaining to the field of communications.
Prerequisite: None

T-Soc 102—Principles of Sociology: An introductory course in the principles of sociology. An attempt to provide an understanding of culture, collective behavior, community life, social institutions and social change. Presents the scientific study of man's behavior in relation to other men, the general laws affecting the organization of such relations and the efforts of social life on human personality and behavior.
Prerequisite: None

T-Eln 241—Digital Principles & Applications: Basic computer concepts including: Binary and Octal numbers, binary codes, boolean algebra, arithmetic circuits, logic gates, flip-flops, input-out devices, memory devices, D/A and A/D converters.
Prerequisite: None

T-Eln 230—Electronic Project: Continuation of project T-Eln 229.
Prerequisite: T-Eln 229

SIXTH QUARTER

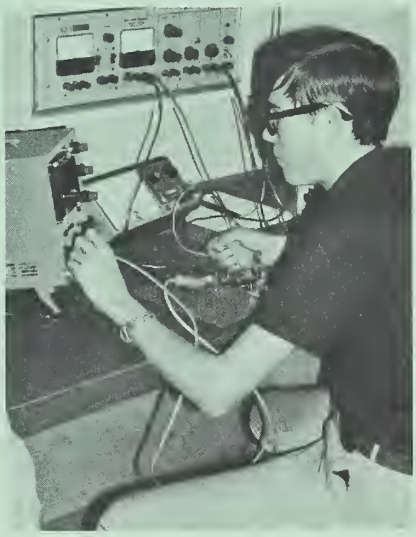
T-Eln 233—F.C.C. 2nd Class License Preparation: A study of various circuit configurations and theory of radios and transmitters as required by the F.C.C. 2nd class license.
Prerequisite: T-Eln 232 or F.C.C. First Class License

T-Eln 231—Electronic Project: Advanced continuation of T-Eln 230.
Prerequisite: T-Eln 230

T-Eln 220—Electronic Systems: A block diagram course investigating numerous electronic systems. Modules or blocks of various circuits already studied are arranged in various manners to produce complex electronic systems. Systems will be explained and reduced to functions and then to block diagrams. AM, FM, and Single sideband transmitters and receivers, multiplexing, TV transmitters and receivers, pulse-modulated systems, computers, telemetry, navigational systems, sonar and radar will be considered.
Prerequisite: T-Eln 205

T-Soc 206—American Institutions: A study of the effect of American social, economic, political, religious, and educational institutions upon the individual in his role as a citizen and a worker. The course dwells upon current local, national, and global problems in the light of our political and economic heritage.
Prerequisite: None

T-Bus 272—Principles of Supervision: Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.
Prerequisite: None



GENERAL OFFICE TECHNOLOGY

More people are now employed in clerical occupations than in any other single job category. Automation and increased production will means that these people will need more technical skills and a greater adaptability for diversified types of jobs.

The General Office Occupations curriculum is designed to develop the necessary variety of skills for employment in the business world. Specialized training in skill areas is supplemented by related courses in mathematics, accounting, business law, and applied psychology.

The graduate of the General Office Occupations curriculum may be employed as an administrative assistant, accounting clerk, assistant office manager, bookkeeper, file clerk, or a variety of other clerical-related jobs. Positions are available in amost every type of business, large or small.

GENERAL OFFICE TECHNOLOGY

		Hours Per Week		Quarter Hours
FIRST QUARTER		Class	Lab	Credit
T-ENG	101-C—Grammar and Composition	3	2	4
T-BUS	102—Typewriting (Or Elective)	2	3	3
T-MAT	110—Business Mathematics	5	0	5
T-ECO	102—Economics	3	0	3
T-BUS	101—Introduction to Business	5	0	5
		18	5	20
SECOND QUARTER				
T-ENG	102-C—Grammar and Composition	3	2	4
T-BUS	103—Typewriting	2	3	3
T-BUS	115—Business Law	3	0	3
T-BUS	120—Accounting	5	2	6
T-ECO	104—Economics	3	0	3
		16	7	19
THIRD QUARTER				
T-ENG	206—Business Communication	3	0	3
T-BUS	104—Intermediate Typewriting	2	3	3
T-BUS	121—Accounting	5	2	6
T-BUS	183—Terminology and Vocabulary (Technical)	3	0	3
T-BUS	110-C—Office Machines	3	2	4
		16	7	19
FOURTH QUARTER				
T-BUS	205—Advanced Typewriting	2	3	3
T-EDP	104—Introduction to Data Processing Systems	3	2	4
T-PSY	206—Applied Psychology	3	0	3
T-ENG	204—Oral Communication	3	0	3
T-BUS	122—Accounting	5	2	6
		16	7	19
FIFTH QUARTER				
T-BUS	213—Office Procedures	3	2	4
T-BUS	212—Machine Transcription	1	2	2
T-SOC	102—Principles of Sociology	3	0	3
T-BUS	209—Advanced Typewriting	2	3	3
T-ENG	205—Advanced Grammar	3	2	4
		12	9	16
SIXTH QUARTER				
T-BUS	112-C—Filing	3	2	4
T-BUS	210—Advanced Typewriting	2	3	4
T-BUS	272-C—Office Management and Supervision	3	2	4
T-SOC	206—American Institutions	3	0	3
T-BUS	239—Marketing	5	0	5
		16	7	19

GENERAL OFFICE TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101-C—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequisite: None

T-Bus 102—Typewriting: Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts.
Prerequisite: None

T-Mat 110—Business Mathematics: This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, taxes, and pertinent use of mathematics in the field of business.
Prerequisite: None

T-Eco 102—Economics: The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None

T-Bus 101—Introduction to Business: A survey of the business world with particular attention devoted to the structure of the various types of business organization, methods of financing, internal organization, and management.
Prerequisie: None

SECOND QUARTER

T-Eng 102-C—Grammar and Composition: A continuation of T-Eng 101-C, Grammar and Composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101-C

T-Bus 103—Typewriting: Instruction emphasizes the development of speed and accuracy with further mastery of correct typewriting techniques. These skills and techniques are applied in tabulation, manuscript, correspondence, and business forms.
Prerequisite: T-Bus 102 or the equivalent. Minimum speed required, 15 words per minute for 3 minutes with six errors allowed.

T-Bus 115—Business Law: A general course designed to acquaint the student with certain fundamentals and principles of business law, including contracts, negotiable instruments, and agencies.
Prerequisite: None

T-Bus 120—Accounting: Principles, techniques and tools of accounting, for understanding of the mechanics of accounting. Collecting, summarizing, analyzing and reporting information about service and mercantile enterprises, to include practical application of the principles learned.
Prerequisite: T-Mat 110

T-Eco 104—Economics: Greater depth in principles of economics, including a penetration into the composition and pricing of national output, distribution of income, international trade and finance, and current economic problems.
Prerequisite: T-Eco 102

THIRD QUARTER

T-Eng 206—Business Communication: Develops skills in techniques in writing business communications. Emphasis is placed on writing action—getting sales letters and prospectuses. Business reports, summaries of business conferences, letters involving credit, collections, adjustments, complaints, orders, acknowledgments, remittances, and inquiry.
Prerequisite: T-Eng 102-C

T-Bus 104—Intermediate Typewriting: Emphasis on production typing problems and speed building. Attention to the development of the student's ability to function as an expert typist, producing mailable copies. The production units are tabulation, manuscript, correspondence, and business forms.
Prerequisite: T-Bus 103 or the equivalent. Minimum speed requirement, 30 words per minute for 5 minutes with five errors allowed.

T-Bus 121—Accounting: Partnership and corporation accounting including a study of payrolls, federal and state taxes. Emphasis is placed on the recording, summarizing, and interpreting data for management control rather than on bookkeeping skills. Accounting services are shown as they contribute to the recognition and solution of management problems.
Prerequisite: T-Bus 120

T-Bus 183—Terminology and Vocabulary: To develop an understanding of the terminology and vocabulary appropriate to the course of study, as it is used in business, technical, and professional offices.
Prerequisite: None

T-Bus 110-C—Office Machines: A general survey of the business and office machines. Students will receive training in techniques, processes, operation and application of the ten-key adding machine, full keyboard adding machines, and calculator.
Prerequisite: None

FOURTH QUARTER

T-Bus 205—Advanced Typewriting: Emphasis is placed on the development of individual production rates. The student learns the techniques needed in planning and in typing projects that closely approximate the work appropriate to the field of study. These projects include review of letter forms, methods of duplication, statistical tabulation, and the typing of reports, manuscripts and legal documents.
Prerequisite: T-Bus 104. Minimum speed requirement, 40 words per minute for 5 minutes with four errors allowed.

T-Edp 104—Introduction to Data Processing: Fundamental concepts and operational principles of data processing systems, as an aid in developing a basic knowledge of computers, a prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses.
Prerequisite: None

T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given

to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and member of the general community.
Prerequisite: None

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Bus 122—Accounting: Advanced practice problems in accounting. Emphasis on detailed and accurate interpretation of data for management.
Prerequisite: T-Bus 121

FIFTH QUARTER

T-Bus 213—Office Procedures: Designed to acquaint the student with the responsibilities encountered by a general office worker during the work day. These include the following: receptionist duties, handling the mail, telephone techniques, travel information, telegrams, office records, purchasing of supplies, office organization, and insurance claims.
Prerequisite: None

T-Bus 212—Machine Transcription: A study and practice in the use of transcribing machines in business dictation. Proficiency in word usage, correct grammar, and letter styles will be emphasized.
Prerequisite: T-Bus 103

T-Soc 102—Principles of Sociology: An introductory course in the principles of sociology. An attempt to provide an understanding of culture, collective behavior, community life, social institutions and social change. Presents the scientific study of man's behavior in relation to other men, the general laws affecting the organization of such relationships and the effect of social life on human personality and behavior.
Prerequisite: None

T-Bus 209—Advanced Typewriting: Emphasis is placed on speed building and on typing projects related to actual office situations. These include additional duplication, tabulation, and the typing of rough-draft and straight-copy documents, reports, and forms used in legal, technical, and business offices.
Prerequisite: T-Bus 205. Minimum speed requirement, 45 words per minute for 5 minutes with three errors allowed.

T-Eng 205—Advanced Grammar: Close and detailed examination of usage from the word level to the total composition level, with emphasis on not merely the correcting of errors but on the upgrading of the student's ability to think and reason why correction of errors and improvements in usage are necessary and on his ability to compose good examples to illustrate the principles under study.
Prerequisite: None

SIXTH QUARTER

T-Bus 112-C—Filing: Fundamentals of indexing and filing, combining theory and practice by the use of miniature letters, filing boxes and guides. Alphabetic, Triple Check, Automatic, Geographic, Subject, Soundex, and Dewey Decimal filing.
Prerequisite: None

T-Bus 210—Advanced Typewriting: A course designed to fill the need of the student in his final quarter of typewriting. Additional emphasis placed on accuracy and speed.

Prerequisite: T-Bus 209. Minimum speed requirement, 50 words per minute for 5 minutes with three errors allowed.

T-Bus 272-C—Office Management and Supervision: Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.

Prerequisite: None

T-Soc 206—American Institutions: A study of the effect of American social, economic, political, religious, and educational institutions upon the individual in his role as a citizen and a worker. The course dwells upon current local, national, and global problems in the light of our political and economic heritage.

Prerequisite: None

T-Bus 239—Marketing: A study of the marketing structure within the framework of the U. S. economic system. It includes the study of the movement of goods from producer to consumer through various channels of distribution, the functions of marketing, the social and economic implications.

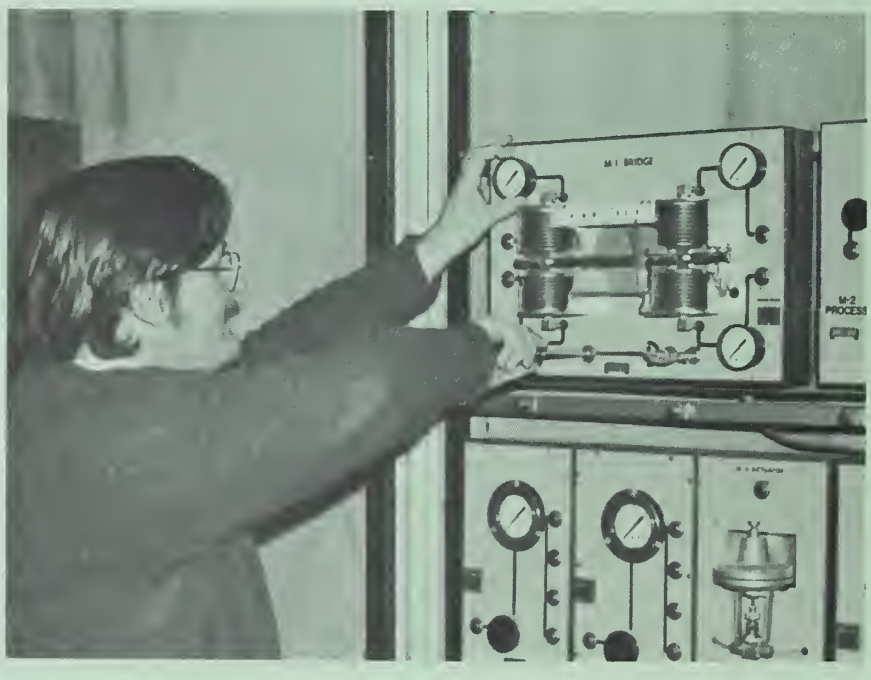
Prerequisite: None

INSTRUMENTATION TECHNOLOGY

Measuring and controlling instruments are now in such widespread use in our modern world that we take them for granted.

The progress of industry depends on precise, effective, and diversified instruments. The Instrumentation Technician has a tremendous responsibility to both production and production control in all industries.

Instruments are used for measurement and control of industrial manufacturing, conversion, or treating processes. An Instrumentation Technician must deal with variables that affect properties such as temperature, pressure, flow, level, humidity, density, viscosity, etc. In short, instrumentation men are key personnel to keeping a manufacturing firm running. Should any major piece of equipment break down usually it remains out of operation until such time the instrumentation man can make necessary repairs or adjustments. The Instrumentation Technician in most manufacturing plants works with or assists engineers in their work, and therefore training is similar to that of the engineer.



INSTRUMENTATION TECHNOLOGY

FIRST QUARTER		Hours Per Week Class	Lab	Quarter Hours Credit
T-ENG	101—Grammar and Composition	3	0	3
T-MAT	101-C—Technical Mathematics	5	0	5
T-MAT	111—Applied Mathematics for Electronics	5	0	5
T-ELC	107—Electricity I	4	2	5
T-ELN	106—Electronics I (Instrument Familiarization)	2	6	4
		19	8	22
SECOND QUARTER				
T-ENG	102—Grammar and Composition	3	0	3
T-MAT	102-C—Technical Mathematics	5	0	5
T-MAT	112—Applied Mathematics for Electronics	3	0	3
T-ELC	108—Electricity II	4	2	5
T-ELN	107—Electronics II (Semiconductor Diodes & Vacuum Tubes)	5	6	7
		20	8	23
THIRD QUARTER				
T-ENG	103—Report Writing	3	0	3
T-MAT	103-C—Technical Mathematics	5	0	5
T-MAT	113—Applied Mathematics for Electronics	3	0	3
T-ELC	109—Electricity III	4	2	5
T-ELN	108—Electronics III (Transistors)	4	3	5
T-DFT	101—Technical Drafting	1	3	2
		20	8	23
FOURTH QUARTER				
T-ELN	241-C—Digital Principles and Applications	2	3	3
T-ELN	224—Measurement and Control I	2	12	6
T-ELN	218—Test Equipment, Instrumentation	2	3	3
T-PSY	206—Applied Psychology	3	0	3
		9	18	15
FIFTH QUARTER				
T-ELN	225—Measurement and Control II	2	9	5
T-ELN	209—Laboratory Analyzing Instruments	2	3	3
T-CHM	115-C—Instrumentation Chemistry	5	3	6
T-SOC	102—Principles of Sociology	3	0	3
		12	15	17
SIXTH QUARTER				
T-ELN	226-C—Measurement and Control III	4	12	8
T-ELN	236—Instrumentation Field Trips	0	3	1
T-BUS	272—Principles of Supervision	3	0	3
T-SOC	206—American Institutions	3	0	3
		10	15	15

INSTRUMENTATION TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequisite: None

T-Mat 101-C—Technical Mathematics: The general area of basic mathematical concepts is presented, including common and decimal fractions, squares and square roots. The essential elements of algebra are also presented, including: positive and negative numbers, algebraic terminology, polynomials, exponents, scientific notation and powers of 10, grouping symbols, first degree and literal equations. Use of the slide rule is introduced at the beginning of this course. The application of principles learned is stressed in practical problems.
Prerequisite: None

T-Mat 111—Applied Mathematics for Electronics: Designed to aid the student by mathematical applications of the basic theories and principles of electricity. Scientific notation, units and dimensions, and Ohm's Law regarding series and parallel DC circuits are studied.
Prerequisite: None

T-Elc 107—Electricity I: Introduction to basic theories and principles of electricity. Electrostatics, basic units, symbols, Ohm's Law, basic DC circuits, power, DC sources, and complex circuits are major parts of the course. Practical applications are stressed.
Prerequisite: None

T-Eln 106—Electronics I: Instrument familiarization. Functional use of the various test instruments used in the Electronics and Instrumentation fields.
Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102-C—Technical Mathematics: This is a continuation of T-Mat 101-C. Numerical trigonometry is introduced in this course and includes right triangles and radian measure of angles. A working knowledge of numerical computations is acquired, utilizing logarithms in conjunction with the slide rule. Linear graphs, simultaneous equations and determinants are also introduced.
Prerequisite: T-Mat 101-C

T-Mat 112—Applied Mathematics for Electronics: This is a continuation of T-Mat 111. Mathematical applications are made to the study of resistivity, multipliers, alternating currents, induction, reactance, impedance, phase relations, and transformers.
Prerequisite: T-Mat 111 or Equivalent

T-Elc 108—Electricity II: A continuation of T-Elc 107. Introduction to meters, magnetism, alternating current theory covering simple generators, sine wave analysis, induction, reactance, impedance, phase relations, and transformers. Practical applications are stressed.
Prereqhisite: T-Elc 107 or Equivalent

T-Eln 107—Electronics II: A study of semiconductor diodes, including tunnel diodes, zener diodes, and light emitting diodes, also vacuum tube characteristics, circuit parameters of basic amplifiers. Filter circuits, RL, RC and RLC.
Prerequisites: T-Elc 107 and T-Eln 106

THIRD QUARTER

T-End 103—Report Writing: The fundamentals of English are utilized as a back ground for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Mat 103-C—Technical Mathematics: This is a continuation of T-Mat 102-C. More advanced algebraic subjects are presented, including: Special products, factoring, algebraic fractions, exponents and radicals, vector and phasor algebra, quadratic equations, graphs of quadratics, maximum and minimum, and imaginary numbers. Measurements and computations involving areas and volumes of regular figures and solids are introduced as well as trigononometric functions of oblique triangles.
Prerequisite: T-Mat 102-C

T-Mat 113—Applied Mathematics for Electronics: This is a continuation of

T-Mat 112. Mathematical applications are made to the study of capacitance, complex RCL circuits, resonance, filters and multiphase power.
Prerequisite: T-Mat 112 or Equivalent

T-Elc 109—Electricity III: A continuation of T-Elc 108. Introduction to capacitance, complex RCL circuits, resonance, filters and multiphase power. Practical applications are stressed.
Prerequisite: T-Elc 108 or Equivalent

T-Eln 108—Electronics III: Theory & Applications of Transistor Circuits. Biasing, class of amplifiers, oscillators, multi-vibrators, coupling, push-pull and push-push amplifiers, and miscellaneous applications will be studied. Continued study of transducer theory and application.
Prerequisite: T-Elc 107

T-Dft 101—Technical Drafting: The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand orthographic and pictorial sketching, geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning.
Prerequisite: None

FOURTH QUARTER

T-Eln 241-C—Digital Principles and Applications: Basic computer concepts including: Binary and Octal numbers, binary codes, boolean algebra, arithmetic circuits, logic gates, flip-flops, input-out devices, memory devices, D/A and A/D converters.
Prerequisite: None

T-Eln 224—Measurement and Control I: Theory and calibration of pressure gauges, vacuum gauges, and pressure switches, using laboratory standards: Dead weight tester, manometer and precision test gauges and associated hardware. Covers the philosophy of measurement and control, levels of accuracy and traceability. General shop practices are included.
Prerequisite: T-Mat 111

T-Eln 218—Test Equipment, Instrumentation: An in-depth study of various test equipment used in the fields of Instrumentation. Multirange instruments, oscilloscopes, potentiometers, RLC Bridges, etc.
Prerequisite: T-Elc 106

T-Psy 206—Applied Psychology. A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None

FIFTH QUARTER

T-Eln 225—Measurement and Control II: A study of control theory and applications with emphasis on electronic and electric controls and mechanisms. Control loops and configurations of electronic and pneumatics constructed and placed in operation. Applications of interfacing covered. Calibration and alignment of constructed systems.
Prerequisite: T-Eln 224

T-Eln 209—Laboratory Analyzing Instruments: A study of instruments that are common in chemical analysis laboratories. Includes titrimeters, conductivity bridges, pH indicators and recorders and Flame photometers.
Prerequisites: T-Eln 224 and T-Eln 218

T-Chm 115-C—Instrumentation Chemistry: This chemistry course has been designed to acquaint the Instrumentation student with some of the basic chemical concepts. In the laboratory, these concepts will be put into practice using industrial type equipment to gather the necessary data.
Prerequisite: None

T-Soc 102—Principles of Sociology: An introductory course in the principles of sociology. An attempt to provide an understanding of culture, collective behavior, community life, social institutions and social change. Presents the scientific study of man's behavior in relation to other men, the general laws affecting the organization of such relationships and the effects of social life on human personality and behavior.
Prerequisite: None

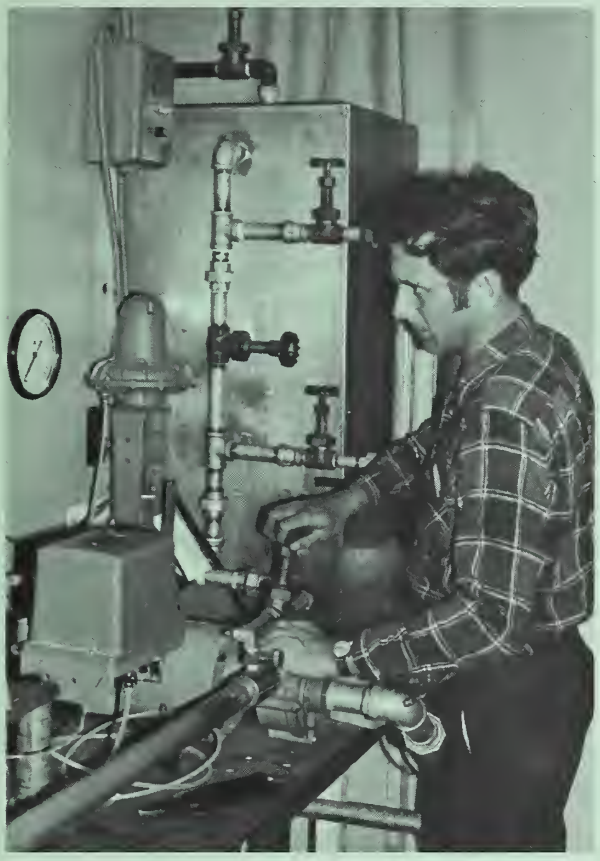
SIXTH QUARTER

T-Eln 226-C—Measurement and Control III: Troubleshooting techniques studied and practiced using standard instrument maintenance test equipment. Includes setting up actual loops and control systems, tubing and piping layouts studied. Instruments dismantled and reassembled, calibrated and placed in service.
Prerequisites: T-Eln 225 and T-Chm 115-C

T-Eln 236—Instrumentation Field Trips: Field trips to local industries. Lectures by instrument technicians and engineers.
Prerequisite: None

T-Bus 272—Principles of Supervision: Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.
Prerequisite: None

T-Soc 206—American Institutions: A study of the effect of American social, economic, political, religious, and educational institutions upon the individual in his role as a citizen and a worker. The course dwells upon current local, national, and global problems in the light of our political and economic heritage.
Prerequisite: None



MARINE ELECTRONICS

PURPOSE:

Research vessels, fishing fleets and pleasure craft have become highly dependent on electronic equipment in order to perform and successfully complete assigned missions and tasks. This dependency is increasing daily and shall continue to do so, since the need for concise, accurate and specific data concerning the ocean, navigation and communications is increasing as rapidly as the population.

Electronic industries concerned with marine instrumentation are constantly striving to produce more accurate and reliable equipment. As a result of this effort has come more sophisticated equipment, thus, demanding more competent Marine Electronic Technicians.

This demand for competent Marine Electronic Technicians has not been met on any level, i.e., research and development, manufacturing, installation, calibration and general marine instrument maintenance.

Due to the nature and environmental conditions of marine instrumentation, the Marine Electronic Technician must utilize special talents and abilities to carry out his daily work in installation, calibration and maintenance.

This curriculum is designed to provide the basic fundamentals and working knowledge of marine instrumentation and encourage the development of individual talents that will enable the technician to successfuly cope with established state of the art systems encountered in marine laboratories aboard ship and pleasure craft, as well as land based facilities.

Employment may be found with existing marine electronic firms, fishing fleets, shipbuilders, manufacturers of marine electronics equipment, ocean going research vessels, and agencies involved in water quality and pollution control.

It is expected that students participating in this program will have successfully completed two years of study at a technical institute in electronics or instrumentation programs or possess the equivalent of two years in the electronics or instrumentation fields.

MARINE ELECTRONICS

SUMMER QUARTER		Hours Per Week Class	Lab	Quarter Hours Credit
T-MSC	129—Oceanography and Oceanographic Instrumentation	2	6	5
T-MSC	105—Shipboard Orientation and Basic Seamanship	0	2	1
T-ELN	102—Electronic Navaid Systems	3	6	6
T-ELN	103— Small Craft Electronics and Electrical Systems	2	2	3
T-ELN	104—Shipboard Electro-Mechanical Systems	2	4	4
		9	20	19

T-Msc 129—Oceanography and Oceanographic Instrumentation: A general description of the ocean, its geologic features, its chemical composition, its plant and animal life, and its physical characteristics. An introduction to oceanographic and geophysical survey techniques and oceanographic instrumentation including data acquisition and storage with emphasis on acoustic systems, S.T.D. systems and water quality instrumentation. Students will receive practical experience in set up, operation, maintenance and trouble shooting of instrumentation in the shop and aboard ship.

Prerequisite: None

T-Msc 105—Shipboard Orientation and Basic Seamanship: An introduction to ships and requirements of shipboard life. Shipboard nomenclature, ship construction and water, fuel, heating, air and propulsion systems will be studied. Safety at sea will be stressed and fire, man overboard, and abandon ship drills will be practiced. Students will receive practical instruction in rules of the road, small boat handling and marlinespike seamanship.

Prerequisite: None

T-Eln 102—Electronic Navaid Systems: A study of long and short range navigation equipments and systems, i.e., theory of operation, installation and maintenance.

Prerequisite: None

T-Eln 103—Small Craft Electronics and Electrical Systems: A study of general electronic and electrical systems employed aboard pleasure craft and fishing fleets; i.e., Loran, R.D.F., fish finders, communication equipment and small craft electrical power systems.

Prerequisite: None

T-Eln 104—Shipboard Electro-Mechanical Systems: A study of power generation and regulation, motors, generators and MG sets and emergency systems. Pneumatic and hydraulic principles, winches and hoists. Servo systems, electric and hydraulic.

Prerequisite: None

MARINE LABORATORY TECHNOLOGY

Graduates of this program will serve in a technical capacity in oceanographic and other marine-oriented laboratories assisting professional scientists with basic research in biology, geology, physics and chemistry. The ocean science technician will also participate in shipboard surveys whenever such occasion becomes necessary; will be familiar with the kinds of measuring and sampling equipment used in oceanography; will operate the shipboard laboratory, will master techniques and methods commonly employed in oceanographic operations.

The technician will inherit much of the responsibility associated with the laboratory, (through a working alliance with the professional scientist), by relieving the scientist from many of the technical obstacles standing in the path of pure research.

MARINE LABORATORY TECHNOLOGY

FIRST QUARTER

T-ENG	101—Grammar and Composition	3	0	3
T-MAT	101-C—Technical Mathematics	5	0	5
T-BIO	131—Marine Biology	3	2	4
T-MSC	107—Oceanography I	3	0	3
T-MSC	100—Small Boat Handling	1	3	2
T-MSC	117—Science Field Trip	0	4	1
T-PSY	206—Applied Psychology	3	0	3
		18	9	21

SECOND QUARTER

T-ENG	102—Grammar and Composition	3	0	3
T-MAT	102-C—Technical Mathematics	5	0	5
T-BIO	132—Marine Biology	3	2	4
T-CHM	101—Introduction to Chemistry	3	2	4
T-MSC	201—Aquarium Systems	3	2	4
T-MSC	118—Science Field Trip	0	4	1
		17	10	21

THIRD QUARTER

T-ENG	103—Report Writing	3	0	3
T-MAT	103-C—Technical Mathematics	5	0	5
T-PHY	101—Physics: Properties of Matter	3	2	4
T-MSC	215—Oceanographic Instrumentation	3	2	4
T-CHM	108—Practical Analysis of Seawater	3	2	4
T-MSC	119—Science Field Trip	0	4	1
		17	10	21

FOURTH QUARTER

T-ENG	204—Oral Communication	3	0	3
T-MAT	201—Technical Mathematics	5	0	5
T-CHM	109—Practical Analysis of Seawater	3	2	4
T-PHY	102—Physics: Work, Energy, Power	3	2	4
T-BIO	111—Microbiology	3	2	4
T-MSC	217—Science Field Trip	0	4	1
		17	10	21

FIFTH QUARTER

T-MSC	216—Oceanographic Data	3	2	4
T-ELC	107—Electricity I	4	2	5
T-MAT	211—Basic Statistics	3	0	3
T-SOC	102—Principles of Sociology	3	0	3
T-GEO	101—Geology	1	4	3
T-MSC	218—Science Field Trip	0	4	1
T-PHO	110—Photography	0	3	1
		14	15	20

SIXTH QUARTER

T-MSC	220—Special Problem	0	6	2
T-ELC	108—Electricity II	4	2	5
T-SOC	206—American Institutions	3	0	3
T-MSC	213—Marine Fishery Science	3	2	4
T-MSC	203—Estuarine Pollution Problems	2	2	3
T-MAT	212—Basic Statistics	3	0	3
		15	12	20

MARINE LABORATORY TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day-to-day situations.
Prerequisite: None

T-Mat 101-C—Technical Mathematics: The general area of basic mathematical concepts is presented, including common and decimal fractions, squares and square roots. The essential elements of algebra are also presented, including: positive and negative numbers, algebraic terminology, polynomials, exponents, scientific notation and powers of 10, grouping symbols, first degree and literal equations. Use of the slide rule is introduced at the beginning of this course. The application of principles learned is stressed in practical problems.
Prerequisite: None

T-Bio 131—Marine Biology: Ecological relationships of marine organisms are emphasized. Physical and chemical factors of the environment and their effects on marine communities are discussed. Some identification and classification of marine organisms is required.
Prerequisite: None

T-Msc 107—Oceanography I: A general description of the oceans, their geology, chemistry, physics, and biology. A survey of methods and techniques used by scientisis in studying the oceans.
Prerequisite: None

T-Msc 100—Small Boat Handling: A practical course in the operation and handling of small boats. Includes a comprehensive study of safety on the water. Students will launch, pilot, and recover a small boat and be instructed on trailering small boats on the highway.
Prerequisite: None

T-Msc 117—Science Field Trips: Field trips for the purpose of acquainting new students with the local biotic communities.
Prerequisite: None

T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102-C—Technical Mathematics: This is a continuation of T-Mat 101-C. Numerical trigonometry is introduced in this course and includes right triangles and radian measure of angles. A working knowledge of numerical computa-

tions is acquired, utilizing logarithms in conjunction with the slide rule. Linear graphs, simultaneous equations and determinants are also introduced.
Prerequisite: T-Mat 101-C

T-Bio 132—Marine Biology: A continuation of T-Bio 131. Major invertebrate and vertebrate marine organisms are discussed.
Prerequisite: T-Bio 131

T-Chm 101—Introduction to Chemistry: A basic study of the properties of substances; elements, compounds, and mixtures; chemical combinations and changes, solutions, acids, bases and salts. In addition, the student will be introduced to basic laboratory equipment and will learn fundamental laboratory techniques.
Prerequisite: None

T-Msc 201—Aquarium Systems: A study of the various marine aquariums and accessories including filters, pumps and other control mechanisms. Students will maintain animal and plant life in controlled aquarium environments.
Prerequisite: None

T-Msc 118—Science Field Trips: Field trips to various environments in the local area for the purpose of collecting and identifying organisms. Students will work in pairs on a special field project.
Prerequisite: None

THIRD QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Mat 103-C—Technical Mathematics: This is a continuation of T-Mat 102-C. More advanced algebraic subjects are presented, including: Special products, factoring, algebraic fractions, exponents and radicals, vector and phasor algebra, quadratic equations, graphs of quadratics, maximum and minimum, and imaginary numbers. Measurements and computations involving areas and volumes of regular figures and solids are introduced as well as trigonometric functions of oblique triangles.
Prerequisite: T-Mat 102-C

T-Phy 101—Physics: Properties of Matter: A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: T-Mat 102-C

T-Msc 215—Oceanographic Instrumentation: An introduction to the basic sampling equipment and methods used in oceanography. Emphasis is placed on equipment and instrumentation used for nearshore and estuarine surveys.
Prerequisite: None

T-Chm 108—Practical Analysis of Seawater: Introduction to the methods and equipment utilized in the analysis of seawater. Salinity, oxygen, and phosphate determinations are covered.
Prerequisite: T-Chm 101

T-Msc 119—Science Field Trips: Field trips to various environments in the local area for the purpose of collecting and identifying organisms. Students will work in pairs on a special field project.
Prerequisite: None

FOURTH QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Mat 201—Technical Mathematics: A continuation of T-Mat 103-C relating all work to specific problems in the marine technical field, such as development of data. An introduction to programming, developing the basic systems of numbers other than base 10, and the arranging and developing of data to form simple program techniques.
Prerequisite: T-Mat 103-C

T-Chm 109—Practical Analysis of Seawater: A continuation of T-Chm 108 in which silicate, nitrate, pH, and chlorophyll determinations are covered.
Prerequisite: T-Chm 108

T-Phy 102—Physics: Work, Energy, Power: Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics forces, center of gravity and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisites: T-Phy 101, T-Mat 103-C

T-Bio 111—Microbiology: A survey of the principles and laboratory techniques employed in the study of micro-organisms. The ecology of microbes in aquatic biology will be emphasized.
Prerequisite: None

T-Msc 217—Science Field Trips: Field trips to various environments in the local area for the purpose of collecting and identifying organisms. Students will work in pairs on a special field project.
Prerequisite: None

FIFTH QUARTER

T-Msc 216—Oceanographic Data: Data acquisition and reduction with stress being placed on the conversion of raw field data to usable laboratory data.
Prerequisite: T-Msc 215

T-Elc 107—Electricity I: Introduction to basic theories and principles of electricity. Electrostatics, basic electric units, symbols, Ohm's Law, basic DC circuits, power, DC sources, and complex circuits are major parts of the course. Practical applications are stressed.
Prerequisite: None

T-Mat 211—Basic Statistics: The student is introduced to the terminology and mathematical notation of statisics. Topics of discussion include he description of numeric distributions (graphs, mean, variance, and standard deviation) and probability.
Prerequisite: T-Mat 103-C

T-Soc 102—Principles of Sociology: An introductory course in the principles of sociology. An attempt to provide an understanding of culture, collective behavior, community life, social institutions and social change. Presents the scientific study of man's behavior in relation to other men, the general laws affecting the organization of such relationships and the effects of social life on human personality and behavior.
Prerequisite: None

T-Geo 101—Geology: The study and identification of minerals and other physical features of the ocean floor. This course will include the identification of rocks and other mineral samples obtained from the ocean bottom. The physical characteristics of the ocean floor will be studied in depth.
Prerequisite: None

T-Msc 218—Science Field Trips: Field trips to various environments in the local area for the purpose of collecting and identifying organisms. Students will work in pairs on a special field project.
Prerequisite: None

T-Pho 110—Introduction to Photography: A basic course in the photographing of objects, and in developing film and prints. Students will study the taking of pictures with the use of natural and artificial lighting.
Prerequisite: None

SIXTH QUARTER

T-Msc 220—Special Problem: A course designed to provide practical experience in field survey and laboratory analytical methods, where these apply to limnology and oceanography. How to collect field data and make observations, as well as how to assemble, operate, and maintain specialized tools will be emphasized.
Prerequisites: T-Msc 215, T-Msc 216

T-Elc 108—Electricity II: A continuation of T-Elc 107. Introduction to meters, magnetism, alternating current theory covering simple generators, sine wave analysis, induction, reactance, impedance, phase relations, and transformers. Practical applications are stressed.
Prerequisite: T-Elc 107 or Equivalent

T-Soc 206—American Institutions: A study of the effect of American social, economic, political, religious, and educational institutions upon the individual in his role as a citizen and a worker. The course dwells upon current local, national, and global problems in the light of our political and economic heritage.
Prerequisite: None

T-Msc 213—Marine Fishery Science: Survey of world, national, and Atlantic Coast fisheries. Includes a look at the most recent catch records at each of the above levels. Most important commercial species and the gear used to obtain them is taught along with conservation and the theory of fishing. A major portion of the student's time is involved with a local commercial fishery project that the student must handle primarily on his own.
Prerequisie: T-Bio 132

T-Msc 203—Estuarine Pollution Problems: A survey course concerning pollution of nearshore and estuarine environments. Students will be assigned projects to be completed during the course.
Prerequisites: T-Msc 208, T-Chm 101, T-Geo 101

T-Mat 212—Basic Statistics: A continuation of T-Mat 211 covering topics in Confidence Interval and distribution of one and two-tailed tests, scatter diagrams, regression coefficien and chi-square.
Prerequisite: T-Mat 211

MARINE TECHNOLOGY

Marine scientific advances of the past decade have led to the development of a strong marine technician training program for North Carolina. A thorough study of marine occupations has shown a great need for personnel trained in the use of modern oceanographic and fishing equipment and techniques. The technological developments of the last ten years have made available to marine scientists the new sophisticated equipment, such as electronic devices for navigation, electronic fish-finders, new devices for data acquisition and reduction, and new methods of carrying out oceanographic research at sea.

As in other facets of our mechanical life, the methods used in past years do not suffice today. Efficiency in the use of all the modern tools available is necessary for success in today's marine science operations.

The Marine Technology program includes a curriculum with a strong base in the science and mathematics needed to meet the challenging requirments of the marine research technician. This two-year curriculum will provide the student with a first-hand opportunity to become proficient in the knowledge and skills of the field. Practical training and cooperative research will be conducted aboard the school's research vessel, The Advance II, which is docked at the Cape Fear Technical Institute at Wilmington, North Carolina.

Each student will be assigned daily duties in maintaining the training vessel in addition to classroom instruction and will be directly involved in the operation of the ship and all research activities on all training cruises.

Graduates of this curriculum may perform experiments and data acquisition and reduction activities associated with the marine laboratory; may operate radar, loran, direction finders, ship radio, depth recorders, fish-finders, and the gyro compass. In addition, they may participate in fish-dragging operations, use of electronic devices, and perform the daily routine tasks necessary for the proper maintenance of the vessel. Marine Technology graduates will have received instruction in navigation, oceanography, marine engineering, and marine biology. Graduates of this curriculum may find job opportunities with the U. S. Navy Oceanographic Office, the U. S. Geodetic Survey, research foundations, private survey companies, marine salvage companies, marine construction companies, fish-processing plants, marinas, boat yards or private fishing concerns. They may also find employment on towboats and yachts.

Prerequisites: Admission requirements and at least one year of high school algebra.

MARINE TECHNOLOGY

		Hours Per Week		Quarter Hours
FIRST QUARTER		Class	Lab	Credit
T-MAT	101C—Technical Mathematics	6	0	5
T-MSC	111—Practical Fishing Operations	1	3	2
T-BIO	131—Marine Biology	3	2	4
T-MSC	107—Oceanography I	3	0	3
T-MSC	100—Small Boat Handling	1	3	2
T-PME	100—Shipboard Orientation	1	3	2
T-MSC	121—Ship Repair	0	4	1
		15	15	19
T-SHI	101—Ship Experience (Cruises)	0	As Earned	As Earned
SECOND QUARTER				
T-ENG	101—Grammar and Composition	4	0	3
T-MAT	102-C—Technical Mathematics	6	0	5
T-MSC	101—Basic Marine Piloting Techniques	1	3	2
T-PME	101—Reciprocating Internal Combustion Engines and Auxiliary Equipment	0	3	1
T-MSC	112—Practical Fishing Operations	1	3	2
T-BIO	132—Marine Biology	3	2	4
T-MSC	122—Ship Repair	0	4	1
		15	15	14
T-SHI	102—Ship Experience (Cruises)	0	As Earned	As Earned
THIRD QUARTER				
T-ENG	102—Grammar and Composition	4	0	3
T-MAT	103-C—Technical Mathematics	6	0	5
T-MSC	102—Navigational Publications & Electronic Procedures	1	3	2
T-PME	102—Reciprocating Internal Combustion Engines and Auxiliary Equipment	0	3	1
T-MSC	113—Practical Fishing Operations	1	3	2
T-PHY	101—Physics: Properties of Matter	4	2	4
T-MSC	123—Ship Repair	0	4	1
		16	15	18
T-SHI	103—Ship Experience (Cruises)	0	As Earned	As Earned

FOURTH QUARTER		Hours Per Week Class	Lab	Quarter Hours Credit
T-MAT	201—Technical Mathematics	6	0	5
T-MSC	103—Navigation and Cartography	1	3	2
T-MSC	114—Practical Fishing Operations	1	3	2
T-CHM	103—Marine Chemistry Lab Operations	1	4	3
T-MSC	108—Oceanography II	2	0	2
T-MSC	213—Marine Fishery Science	3	2	4
T-MSC	124—Ship Repair	0	4	1
		14	16	19
T-SHI	104—Ship Experience (Cruises)	0	As Earned	As Earned

FIFTH QUARTER				
T-ENG	204—Oral Communication	4	0	3
T-DFT	117—Drafting and Blueprint Reading	2	3	3
T-PHY	102—Physics: Work, Energy, Power	4	2	4
T-MSC	202—Oceanography III	1	3	2
T-MSC	204—Oceanography IV	0	3	1
T-PSY	206—Applied Psychology	4	0	3
T-MSC	125—Ship Repair	0	4	1
		15	15	17
T-SHI	105—Ship Experience (Cruises)	0	As Earned	As Earned

SIXTH QUARTER				
T-ELC	107—Electricity I	4	3	5
T-MSC	205—Oceanography V	1	3	2
T-GEO	101—Geology	2	2	3
T-MSC	221—Oceanography VI	0	3	1
T-SOC	102—Principles of Sociology	4	0	3
T-MAT	211—Basic Statistics	4	0	3
T-MSC	126—Ship Repair	0	4	1
		15	15	18
T-SHI	106—Ship Experience (Cruises)	0	As Earned	As Earned

SEVENTH QUARTER				
T-MSC	222—Oceanography VII	1	3	2
T-BIO	110—Field Biology	2	2	3
T-MAT	212—Basic Statistics	4	0	3
T-SOC	206—American Institutions	4	0	3
T-MSC	134—Marine Welding	0	3	1
T-ELC	108—Electricity II	4	3	5
T-MSC	127—Ship Repair	0	4	1
		15	15	18
T-SHI	107—Ship Experience (Cruises)	0	As Earned	As Earned

EIGHTH QUARTER		Hours Per Week Class	Lab	Quarter Hours Credit
T-ENG	103—Report Writing	4	0	3
T-MSC	223—Oceanography VIII	1	3	2
T-BIO	133—Biological Sampling Techniques	0	4	1
T-MSC	224—Oceanography IX	0	3	1
T-PME	103—Marine Diesel Engines	1	3	2
T-ELC	109—Electricity III	4	3	5
T-MSC	128—Ship Repair	0	4	1
		10	20	15
T-SHI	108—Ship Experience (Cruises)	0	As Earned	As Earned

MARINE TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Mat 101-C—Technical Mathematics: The general area of basic mathematical concepts is presented, including common and decimal fractions, squares and square roots. The essential elements of algebra are also presented, including: positive and negative numbers, algebraic terminology, polynomials, exponents, scientific notation and powers of 10, grouping symbols, first degree and literal equations. Use of the slide rule is introduced at the beginning of this course. The application of principles learned is stressed in practical problems.
Prerequisite: None

T-Msc 111—Practical Fishing Operations: The class will be instructed in splicing rope, typing various practical knots, rowing, repairing and maintenance of small boats, rigging and basic net making. Lectures will be on history of fishing from early times to now.
Prerequisite: None

T-Bio 131—Marine Biology: Ecological relationships of marine organisms are emphasized. Physical and chemical factors of the environment and their effects on marine communities are discussed. Some identification and classification of marine organisms is required.
Prerequisite: None

T-Msc 107—Oceanography I: A general description of the oceans, their geology, chemistry, physics, and biology. A survey of methods and techniques used by scientists in studying the oceans.
Prerequisite: Satisfactory evidence that admission requirements have been met.

T-Msc 100—Small Boat Handling: A practical course in the operation and handling of small boats. Includes a comprehensive study of safety on the water. Students will launch, pilot and recover a small boat and be instructed on trailering small boats on the highway.
Prerequisite: None

T-Pme 100—Shipboard Orientation: This course is designed to teach the student about ships. Living and working conditions aboard ship will be stressed. Ship construction, past and present, will be emphasized, including compartmentation, heating and ventilation systems, sanitary systems, and the line-handling aspects of basic seamanship. Safety at sea, including fire, man overboard, and abandon ship drills, will be learned and practiced. Whenever conditions permit, the practical aspects of this course will be taught aboard one of the school's research vessels.
Prerequisite: None

T-Msc 121—Ship Repair: Instruction and actual shipboard experience in the proper use of hand and power tools. Operation of winches, boom, rigging, wire-splicing, paints and application of paint. The student, at different times, will work on deck or engine spaces under supervision of deck or engine personnel, gaining knowledge and experience to function as a proficient member of the crew, dockside or at sea.
Prerequisite: None

T-Shi 101—Ship Experience: All students will receive sea experience aboard the school's vessels during each quarter, the extent and dates to be determined by weather conditions, vessel operational status, and contractual arrangements of chartering scientific agencies. Students will be rotated on various assignments. They should expect to apply theories and practices studied while ashore. It is expected that students will average two weeks sea exprience each quarter they are enrolled in the program. One unit of credit will be given for each 33 hours of ship experience or instruction during cruises.
Prerequisite: None

SECOND QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammer and written compasition in their day to day situations.
Prerequisite: Satisfactory evidence that admission requirements have been met.

T-Mat 102-C—Technical Mathematics: This is a continuation of T-Mat 101-C. Numerical trigonometry is introduced in this course and includes right triangles and radian measure of angles. A working knowledge of numerical computations is acquired, utilizing logarithms in conjunction with the slide rule. Linear graphs, simultaneous equations and determinants are also introduced.
Prerequisite: T-Mat 101-C

T-Msc 101—Basic Marine Piloting Techniques: Comprehensive study of piloting including the tools used, charts of various types and the symbols found on them, navigation aids, buoys, rules of the road and lights. Practical piloting is stressed. Theory of the compass and compass error and its applications to piloting, shipboard procedures and seamanship are also covered.
Prerequisite: Successful completion of T-Msc 100

T-Pme 101—Reciprocating Internal Combustion Engines & Auxiliary Equipment: A basic course introducing the student to the principles and fundamentals of construction, operation, and maintenance of reciprocating internal combustion engines. Related equipment used aboard oceanographic vessels such as air compressors, oil purifiers, boilers and pumps will also be taken up. The subject matter relative to this course will be based, as much as possible, on the engines and related equipment found aboard the school's research vessels.
Prerequisite: T-Pme 100

T-Msc 112—Practical Fishing Operations: The student will learn to complete a gill net by putting on floats, leads, and putting webbing together properly and hanging the net. Lectures will continue on fishing history and famous fishermen.
Prerequisite: T-Msc 111

T-Bio 132—Marine Biology: Continuation of T-Bio 131. Major invertebrate and vertebrate marine organisms are discussed.
Prerequisite: T-Bio 131

T-Msc 122—Ship Repair: Instruction and actual shipboard experience in the proper use of hand and power tools. Operation of winches, boom rigging, wire-splicing, paints and application of paint. The student, at different times, will work on deck or engine spaces under supervision of deck or engine personnel, gaining knowledge and experience to function as a proficient member of the crew, dockside or at sea.
Prerequisite: T-Msc 121

T-Shi 102—Ship Experience: All students will receive sea experience aboard the school's vessels during each quarter, the extent and dates to be determined by weather conditions, vessel operational status, and contractual arrangements of chartering scientific agencies. Students will be rotated on various assignments. They should expect to apply theories and practices studied while ashore. It is expected that students will average two weeks sea exprience each quarter they are enrolled in the program. One unit of credit will be given for each 33 hours of ship experience or instruction during cruises.
Prerequisite: None

THIRD QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 103-C—Technical Mathematics: This is a continuation of T-Mat 102-C. More advanced algebraic subjects are presented, including: Special products, factoring, algebraic fractions, exponents and radicals, vector and phasor algebra, quadratic equations, graphs of quadratics, maximum and minimum, and imaginary numbers. Measurements and computations involving areas and volumes of regular figures and solids are introduced as well as trigonometric functions of oblique triangles.
Prerequisite: T-Mat 102-C

T-Msc 102—Navigational Publications & Electronic Procedures: A continuation of T-Msc 101, with practical shipboard piloting procedures stressed. The use of electronics to extend piloting is introduced and studied including radar, radio direction finding, loran, sonic echo ranging and recording, use of the gyro compass, etc. Experience, both in the classroom and practical, will be given in such areas as aids to navigation, effects of tides and currents, danger angles and soundings. Practical seamanship continues to receive emphasis.
Prerequisite: Successful completion of T-Msc 101

T-Pme 102—Reciprocating Internal Combustion Engines & Auxiliary Equipment: A basic course introducing the student to the principles and fundamentals of construction, operation and maintenance of reciprocating internal combustion engines. Related equipment used aboard oceanographic vessels, such as air compressors, purifiers, boilers and pumps will also be taken up. The subject matter relative to this course will be based, as much as possible, on the engines and equipment found aboard the school's research vessel R/V ADVANCE II.
Prerequisite: T-Pme 101

T-Msc 113—Practical Fishing Operations: Completed nets will be set and fished. Instruction on rigging and handling of tub trawls. Making of shrimp net and doors. Lectures on famous fishing vessels and changing designs.
Prerequisite: T-Msc 112

T-Phy 101—Physics: Properties of Matter: A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experments and specialized problems dealing with these topics are part of this course.
Prerequisite: T-Mat 102-C

T-Msc 123—Ship Repair: Instruction and actual shipboard experience in the proper use of hand and power tools. Operation of winches, boom rigging, wire-splicing, paints and application of paint. The student, at different times, will work on deck or engine spaces under supervision of deck or engine personnel, gaining knowledge and experience to function as a proficient member of the crew, dockside or at sea.
Prerequisite: T-Msc 122

T-Shi 103—Ship Experience: All students will receive sea experience aboard the school's vessels during each quarter, the extent and dates to be determined by weather conditions, vessel operational status, and contractual arrangements of chartering scientific agencies. Students will be rotated on various assignments. They should expect to apply theories and practices studied while ashore. It is expected that students will average two weeks sea exprience each quarter they are enrolled in the program. One unit of credit will be given for each 33 hours of ship experience or instruction during cruises.
Prerequisite: None

FOURTH QUARTER

T-Mat 201—Technical Mathematics: A continuation of T-Mat 103-C relating all work to specific problems in the marine technical field, such as development of data. An introduction to programming, developing the basic systems of numbers other than base 10, and the arranging and developing of data to form simple programming techniques.
Prerequisite: T-Mat 103-C

T-Msc 103—Navigation and Cartography: Elementary principles and practices of Marine Cartography and its relationship to navigation and scientific observations are developed. Additional work in shipboard procedures and practical seamanship is covered.
Prerequisite: Successful completion of T-Msc 102

T-Msc 114—Practical Fishing Operations: This will depend on boats available for use. Lectures will be on modern fishing methods.
Prerequisite: T-Msc 113

T-Chm 103—Marine Chemistry Laboratory Operations: Introduction to the basics of general chemistry (weights and measures, atomic and molecular weights, solution concentrations). Experience with laboratory equipment and techniques with stress of seawater analysis (chlorinity, dissolve oxygen and nutrient determinations).
Prerequisite: T-Mat 103-C

T-Msc 108—Oceanography II: Basic "classical" oceanographic instrumentation is introduced and demonstrated. Emphasis is placed on proper use, maintenance and repair of the basic equipment used for oceanographic research.
Prerequisite: T-Mcs 107

T-Mcs 213—Marine Fishery Science: Survey of world, national, and Atlantic Coast fisheries. Includes a look at the most recent catch records at each of the above levels. Most important commercial species and the gear used to obtain them is taught along with conservation and the theory of fishing. A major portion of the student's time is involved with a local commercial fishery project that the student must handle primarily on his own.
Prerequisite: T-Bio 132

T-Msc 124—Ship Repair: Instruction and actual shipboard experience in the proper use of hand and power tools. Operation of winches, boom rigging, wire-splicing, paints and application of paint. The student, at different times, will work on deck or engine spaces under supervision of deck or engine personnel, gaining knowledge and experience to function as a proficient member of the crew, dockside or at sea.
Prerequisite: T-Msc 123

T-Shi 104—Ship Experience: All students will receive sea experience aboard the school's vessels during each quarter, the extent and dates to be determined by weather conditions, vessel operational status, and contractual arrangements of chartering scientific agencies. Students will be rotated on various assignments. They should expect to apply theories and practices studied while ashore. It is expected that students will average two weeks sea exprience each quarter they are enrolled in the program. One unit of credit will be given for each 33 hours of ship experience or instruction during cruises.
Prerequisite: None

FIFTH QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Dft 117—Drafting & Blueprint Reading: The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand orthographic and pictorial sketching, geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning. Shop processes are introduced.
Prerequisite: None

T-Phy 102—Physics: Work, Energy, Power: Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisites: T-Phy 101, T-Mat 103-C

T-Msc 202—Oceanography III: Introduction to the use of the field data sheets. Salinity and temperature observations. Reversing thermometer correction and thermometric depth calculations. Graphical representation of hydrographic stations. Data taken at sea by students will be used whenever possible.
Prerequisites: Successful completion of T-Msc 108 and T-Chm 101

T-Msc 204—Oceanography IV: A continuation of T-Msc 108 offering practical shop training in Design, Testing, Construction, maintenance and repair of specialized tools in general oceanography.
Prerequisite: Successful completion of T-Msc 108

T-Psy 206 Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None

T-Msc 125—Ship Repair: Instruction and actual shipboard experience in the proper use of hand and power tools. Operation of winches, boom rigging, wire-splicing, paints and application of paint. The student, at different times, will work on deck or engine spaces under supervision of deck or engine personnel, gaining knowledge and experience to function as a proficient member of the crew, dockside or at sea.
Prerequisite: T-Msc 124

T-Shi 105—Ship Experience: All students will receive sea experience aboard the school's vessels during each quarter, the extent and dates to be determined by weather conditions, vessel operational status, and contractual arrangements of chartering scientific agencies. Students will be rotated on various assignments. They should expect to apply theories and practices studied while ashore. It is expected that students will average two weeks sea exprience each quarter they are enrolled in the program. One unit of credit will be given for each 33 hours of ship experience or instruction during cruises.
Prerequisite: None

SIXTH QUARTER

T-Elc 107—Electricity I: Introduction to basic theories and principles of electricity. Electrostatics, basic electric units, symbols, Ohm's Law, basic DC circuits, power, DC sources, and complex circuits are major parts of the course. Practical applications are stressed.
Prerequisite: None

T-Msc 205—Oceanography V: Calculation of physical properties of seawater from salinity, temperature, and depth data. Graphical display of physical properties (contouring), including the basics of interpretation.
Prerequisite: Successful completion of T-Msc 204

T-Geo 101—Geology: A summary of marine sedimentation is presented. Field sampling methods are introduced, demonstrated and incorporated in a field project for the student. Samples taken will be processed as a laboratory exercise.
Prerequisite: None

T-Msc 221—Oceanography VI: Introduction to development, construction, installation and use of oceanographic survey systems aboard school Smallcraft and Research Vessels, and actual use of such systems in training and research programs. Application of Electronic Systems will be stressed and, when available, actually used in this course.
Prerequisite: Successful completion of T-Msc 204

T-Soc 102—Principles of Sociology: An introductory course in the principles of sociology. An attempt to provide an understanding of culture, collective behavior, community life, social institutions and social change. Presents the scientific study of man's behavior in relation to other men, the general laws affecting the organization of such relationships and the effects of social life on human personality and behavior.
Prerequisite: None

T-Mat 211—Basic Statistics: The student is introduced to the terminology and mathematical notation of statistics. Topics of discussion include the description of numeric distributions (graph, mean, variance, and standard, deviation, and probability).
Prerequisite: T-Mat 103

T-Msc 126—Ship Repair: Instruction and actual shipboard experience in the proper use of hand and power tools. Operation of winches, boom rigging, wire-splicing, paints and application of paint. The student, at different times, will work on deck or engine spaces under supervision of deck or engine personnel, gaining knowledge and experience to function as a proficient member of the crew, dockside or at sea.
Prerequisite: T-Msc 125

T-Shi 106—Ship Experience: All students will receive sea experience aboard the school's vessels during each quarter, the extent and dates to be determined by weather conditions, vessel operational status, and contractual arrangements of chartering scientific agencies. Students will be rotated on various assignments. They should expect to apply theories and practices studied while ashore.

It is expected that students will average two weeks sea exprience each quarter they are enrolled in the program. One unit of credit will be given for each 33 hours of ship experience or instruction during cruises.
Prerequisite: None

SEVENTH QUARTER

T-Msc 222—Oceanography VII: Introduces the student to the fundamentals of laboratory procedure and to the operation, maintenance and calibration of chemical instrumentation used in typical oceanographic and Limnological Environmental Surveys.
Prerequisites: T-Chm 103, T-Geo 101, and T-Msc 221

T-Bio 110—Field Biology: A survey course in Field Biology stressing pollution biology. Extensive field work in the study of estuarine and littoral pollution will be included. Students will be assigned an individual project on an appropriate subject to be completed during the course.
Prerequisite: None

T-Mat 212—Basic Statistics: A continuation of T-Mat 211 covering topics in Confidence Interval and distribution of one and two-tailed tests, scatter diagrams, regression coefficient and chi-square.
Prerequisite: T-Mat 211

T-Soc 206—American Institutions: A study of the effect of American social, economic, political, religious, and educational institutions upon the individual in his role as a citizen and a worker. The course dwells upon current local, national, and global problems in the light of our political and economic heritage.
Prerequisite: None

T-Msc 134—Marine Welding: Welding demonstrations by the instructor and practice by students in the welding shop. Metallurgy of welding discussed. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding and flame cutting. Emphasis on electric arc and gas welding methods applicable to mechanical repair work. Brazing also covered.
Prerequisite: None

T-Elc 108—Electricity II: A continuation of T-Elc 107. Introduction to meters, magnetism, alternating current theory covering simple generators, sine wave analysis, induction, reactance, impedance, phase relations, and transformers. Practical applications are stressed.
Prerequisite: T-Elc 107 or Equivalent

T-Msc 127—Ship Repair: Instruction and actual shipboard experience in the proper use of hand and power tools. Operation of winches, boom rigging, wire-splicing, paints and application of paint. The student, at different times, will work on deck or engine spaces under supervision of deck or engine personnel, gaining knowledge and experience to function as a proficient member of the crew, dockside or at sea.
Prerequisite: T-Msc 126

T-Shi 107—Ship Experience: All students will receive sea experience aboard the school's vessels during each quarter, the extent and dates to be determined by weather conditions, vessel operational status, and contractual arrangements of chartering scientific agencies. Students will be rotated on various assignments. They should expect to apply theories and practices studied while ashore. It is expected that students will average two weeks sea exprience each quarter they are enrolled in the program. One unit of credit will be given for each 33 hours of ship experience or instruction during cruises.
Prerequisite: None

EIGHTH QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.

Prerequisite: None

T-Msc 223—Oceanography VIII: Introduction to Colorimetric, Spectrophotometric Autoanalytical and chromatographic techniques of seawater nutrient analysis in the laboratory and on actual field surveys. Methods used in determining primary productivity levels will be stressed.

Prerequisite: T-Msc 222

T-Bio 133—Biological Sampling Techniques: A lab course in which the student is introduced to different types of biological sampling equipment used aboard ship. Also sampling equipment used on small boats and the types used afoot will be studied. A good portion of the student's time is utilized in building some biological sampling apparatus.

Prerequisite: None

T-Msc 224—Oceanography IX: An application of all techniques previously learned to individual special student projects conducted under instructor supervision either independently or in cooperation with a local marine research facility. Originality and relationship to marine subjects of current scientific interest will be emphasized.

Prerequisite: T-Msc 221

T-Pme 103—Marine Diesel Engines: A course on the fundamentals and principles of construction, operation, and maintenance of several models of General motors marine diesel engines, including models 567-A and the in-line 71 series. Engines installed on equipment operated by the Institute will be used for instructional purposes.

Prerequisite: T-Pme 102

T-Elc 109—Electricity III: A continuation of T-Elc 108. Introduction to capacitance, complex RCL circuits, resonance, filters and multiphase power. Practical applications are stressed.

Prerequisite: T-Elc 108 or Equivalent

T-Msc 128—Ship Repair: Instruction and actual shipboard experience in the proper use of hand and power tools. Operation of winches, boom rigging, wire-splicing, paints and application of paint. The student, at different times, will work on deck or engine spaces under supervision of deck or engine personnel, gaining knowledge and experience to function as a proficient member of the crew, dockside or at sea.

Prerequisite: None

T-Shi 108—Ship Experience: All students will receive sea experience aboard the school's vessels during each quarter, the extent and dates to be determined by weather conditions, vessel operational status, and contractual arrangements of chartering scientific agencies. Students will be rotated on various assignments. They should expect to apply theories and practices studied while ashore. It is expected that students will average two weeks sea exprience each quarter they are enrolled in the program. One unit of credit will be given for each 33 hours of ship experience or instruction during cruises.

Prerequisite: None

NC 1143 P

SECRETARIAL — ENGINEERING AND TECHNICAL

The Engineering and Technical Secretary Curriculum is designed to prepare a student for a position in the office of a firm dealing in research, development and production in the scientific fields. The curriculum offers students the necessary secretarial skills and the required background of understanding and appreciation of the scientific method, the beginnings of a technical vocabulary and a feeling of respect for accuracy that will be essential in later work in the field.

Graduates of this program may qualify for employment as stenographer-secretaries, technical secretaries, and possibly as private secretaries. They are in demand where engineers and other technical personnel find a need for secretarial help who can understand the specialized language of Electrical, Mechanical, Civil, or Chemical Engineers. The duties of an engineering and technical secretary may consist of taking dictation and reports, meeting office callers and screening telephone calls, filing, and scheduling appointments. Graduates of this program, since they have received a background of science and engineering terminology in addition to their business background, are admirably prepared to work with engineering reports, records and correspondence.

SECRETARIAL — ENGINEERING AND TECHNICAL

		Hours Per Week		Quarter Hours
FIRST QUARTER		Class	Lab	Credit
T-ENG	101-C—Grammar and Composition	3	2	4
T-BUS	102—Typewriting (or Elective)	2	3	3
T-MAT	110—Business Mathematics	5	0	5
T-BUS	106—Shorthand (Elective)	3	2	4
T-ECO	102—Economics	3	0	3
		16	7	19
SECOND QUARTER				
T-ENG	102-C—Grammar and Composition	3	2	4
T-BUS	103—Typewriting	2	3	3
T-BUS	107—Shorthand	3	2	4
T-BUS	115—Business Law	3	0	3
T-BUS	120—Accounting	5	2	6
		16	9	20
THIRD QUARTER				
T-ENG	206—Business Communication	3	0	3
T-BUS	104—Intermediate Typewriting	2	3	3
T-BUS	108—Shorthand	3	2	4
T-BUS	121—Accounting	5	2	6
T-BUS	183—Terminology and Vocabulary (Technical)	3	0	3
		16	7	19
FOURTH QUARTER				
T-BUS	205—Advanced Typewriting	2	3	3
T-BUS	206—Dictation and Transcription	3	2	4
T-BUS	110-C—Office Machines	3	2	4
T-EDP	104—Introduction to Data Processing Systems	3	2	4
T-PSY	206—Applied Psychology	3	0	3
		14	9	18
FIFTH QUARTER				
T-ENG	204—Oral Communication	3	0	3
T-BUS	207-C—Dictation and Transcription	3	2	4
T-DFT	104—Blueprint Reading: Mechanical	3	0	3
T-SOC	102—Principles of Sociology	3	0	3
T-BUS	209—Advanced Typewriting	3	3	3
T-BUS	213—Office Procedures	3	2	4
		17	7	20
SIXTH QUARTER				
T-BUS	112-C—Filing	3	2	4
T-BUS	208—Dictation and Transcription	3	2	4
T-BUS	210—Advanced Typewriting	2	3	3
T-BUS	272-C—Office Management and Supervision	3	2	4
T-SOC	206—American Institutions	3	0	3
		14	9	18

SECRETARIAL — ENGINEERING AND TECHNICAL

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101-C—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequisite: None

T-Bus 102—Typewriting: Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts.
Prerequisite: None

T-Mat 110—Business Mathematics: This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, taxes, and pertinent uses of mathematics in the field of business.
Prerequisite: None

T-Bus 106—Shorthand: A beginning course in the theory and practice of reading and writing shorthand. Emphasis on phonetics, penmanship, word families, brief forms, and phrases.
Prerequisite: None

E-Eco 102—Economics: The fundamental principles of economcis including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None

SECOND QUARTER

T-Eng 102-C—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Bus 103—Typewriting: Instruction emphasizes the development of speed and accuracy with further mastery of correct typewriting techniques. These skills and techniques are applied in tabulation, manuscript, correspondence, and business forms.
Prerequisite: T-Bus 102 or the equivalent. Minimum speed requirement, 15 words per minute for 5 minutes with five errors allowed.

T-Bus 107—Shorthand: Continued study of theory with greater emphasis on dictation and elementary transcription.
Prerequisite: T-Bus 106 or the equivalent

T-Bus 115—Business Law: A general course designed to acquaint the student with certain fundamentals and principles of business law, including contracts, negotiable instruments, and agencies.
Prerequisite: None

T-Bus 120—Accounting: Principles, techniques and tools of accounting, for understanding of the mechanics of accounting. Collecting, summarizing, analyzing, and reporting information about service and mercantile enterprises, to include practical application of the principles learned.
Prerequisite: T-Mat 110

THIRD QUARTER

T-Eng 206—Business Communication: Develops skills in techniques in writing business communications. Emphasis is placed on writing action — getting sales letters and prospectuses. Business reports, summaries of business conferences, letters involving credit, collections, adjustments, complaints, orders, acknowledgments, remittances, and inquiry.

Prerequisite: T-Eng 102

T-Bus 104—Intermediate Typewriting: Emphasis on production typing problems and speed building. Attention to the development of the student's ability to function as an expert typist, producing mailable copies. The production units are tabulation, manuscript, correspondence, and business forms.

Prerequisite: T-Bus 103 or the equivalent. Minimum speed requirement, 25 words per minute for 5 minutes with five errors allowed.

T-Bus 108—Shorthand: Theory and speed building. Introduction to office-style dictation. Emphasis on development of speed in dictation and accuracy in transcription.

Prerequisite: T-Bus 107

T-Bus 121—Accounting: Partnership and corporation accounting including a study of payrolls, federal and state taxes. Emphasis is placed on the recording, summarizing and interpreting data for management control rather than on bookkeeping skills. Accounting services are shown as they contribute to the recognition and solution of management problems.

Prerequisite: T-Bus 120

T-Bus 183—Terminology and Vocabulary: To develop an understanding of the terminology and vocabulary appropriate to the course of study, as it is used in business, technical, and professional offices.

Prerequisite: T-Bus 107

FOURTH QUARTER

T-Bus 205—Advanced Typewriting: Emphasis is placed on the development of individual production rates. The student learns the techniques needed in planning and in typing projects that closely approximate the work appropriate to the field of study. These projects include review of letter forms, methods of duplication, statistical tabulation, and the typing of reports, manuscripts and legal documents.

Prerequisite: T-Bus 104. Minimum speed requirement, 35 words per minute for 5 minutes with four errors allowed.

T-Bus 206—Dictation and Transcription: Develops the skill of taking dictation and of transcribing at the typewriter materials appropriate to the course of study, which includes a review of the theory and the dictation of familiar and unfamiliar material at varying rates of speed. Minimum dictation rate of 80 words per minute for three minutes on new material.

Prerequisite: T-Bus 108

T-Bus 110-C—Office Machines: A general survey of the business and office machines. Students will receive training in techniques, processes, operation and application of the ten-key adding machines, full keyboard adding machines, and calculator.

Prerequisite: None

T-Edp 104—Introduction to Data Processing Systems: Fundamental concepts and operational principles of data processing systems, as an aid in developing a basic knowledge of computers, a prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses.

Prerequisite: None

T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.

Prerequisite: None

FIFTH QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.

Prerequisite: None

T-Bus 207-C—Dictation and Transcription: Covering materials appropriate to the course of study, the student develops the accuracy, speed, and vocabulary that will enable her to meet the stenographic requirements of business and professional offices. Minimum dictation rate of 90 words per minute required for three minutes on new material.

Prerequisite: T-Bus 206

T-Dft 104—Blueprint Reading: Mechanical: Interpretation and reading of blueprints. Development of ability to read and interpret blueprints, charts, instruction and service manuals, and wiring diagrams. Information on the basic principles of lines, views, dimensioning procedures, and notes.

Prerequisite: None

T-Soc 102—Principles of Sociology: An introductory course in the principles of sociology. An attempt to provide an understanding of culture, collective behavior, community life, social institutions and social change. Presents the scientific study of man's behavior in relation to other men, the general laws affecting the organization of such relationships and the effects of social life on human personality and behavior.

Prerequisite: None

T-Bus 209—Advanced Typewriting: Emphasis is placed on speed building and on typing projects related to actual office situations. These include additional duplication, tabulation, and the typing of rough-draft and straight-copy documens, reports, and forms used in legal, technical, and business offices.

Prerequisite: T-Bus 205. Minimum speed requirement, 40 words per minute for 5 minutes with three errors allowed.

T-Bus 213—Office Procedures: Designed to acquaint the student with the responsibilities encountered by a general office worker during the work day. These include the following: receptionist duties, handling the mail, telephone techniques, travel information, telegrams, office records, purchasing of supplies, office organization, and insurance claims.

Prerequisite: None

SIXTH QUARTER

T-Bus 112-C—Filing: Fundamentals of indexing and filing, combining theory and practice by the use of miniature letters, filing boxes and guides. Alphabetic, Triple Check, Automatic, Geographic, Subject, Soundex, and Dewey Decimal filing.

Prerequisite: None

T-Bus 208—Dictation and Transcription: Principally a speed building course, covering materials appropriate to the course of study, with emphasis on speed as well as accuracy. Minimum dictation rate of 100 words per minute required for 3 minutes on new material.

Prerequisite: T-Bus 207

T-Bus 210—Advanced Typewriting: A course designed to fill the need of the student in his final quarter of typewriting. Additional emphasis placed on accuracy and speed.

Prerequisite: T-Bus 209. Minimum speed requirement, 45 words per minute for 5 minutes with three errors allowed.

T-Bus 272-C—Office Management & Supervision: Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.

Prerequisite: None

T-Soc 206—American Institutions: A study of the effect of American social, economic, political, religious, and educational institutions upon the individual in his role as a citizen and a worker. The course dwells upon current local, national, and global problems in the light of our political and economic heritage.

Prerequisite: None

FOXBORO
RECORDER

TRADE DIVISION

TRADE DIVISION

In North Carolina as well as throughout the nation, the demand for skilled tradesmen is at an all-time high. Hardly a day passes that the Institute does not have at least one call from industry looking for prospective employees. Graduates of the trade programs sometimes have as many as four or five offers of employment upon graduation.

Students in the skilled trade programs are trained in shops similar to those of private industries. The shops contain testing and measuring instruments, tools, and equipment of the same size and types as found in private firms. The facilities make possible practical instruction which is essential to the preparation of skilled workers needed by today's modern industries. Students in these trade programs spend twenty-five to thirty hours per week in school; this time is divided between classroom studies and practice shop-work.

Skilled craftsmanship in the occupation, educational background and leadership ability are the basis for instructor selection in these trade courses.

A diploma is awarded to those students who satisfactorily complete the one-year (12 months) trade program. To be eligible for the diploma, a satisfactory passing grade must be maintained in all shop work and related class subjects. Certificates are issued to those who pass less than the whole course of study.

COURSES OFFERED

One year (12 months) training courses are offered in the following skilled trades:

Automotive Body Repair
Automotive Mechanics
Drafting, Mechanical
Heating & Air-Conditioning
Machine Trades
Marine Diesel Mechanics
Operating Room Assistant (6 months)—Offered periodically
Practical Nursing
Radio & Television Servicing
Welding

ADMISSION REQUIREMENTS

1. Must be at least 18 years of age, or his high school class must have graduated.

2. Should be a high school graduate but must have completed at least eight (8) units of high school work — exceptions may be made for more mature adults who have been out of school for some time. Must be a high school graduate or the equivalent* to enter practical nursing program.

3. Must demonstrate aptitude for trade-vocatonal training as determined by standard tests. These tests will aid in student selection, placement, and guidance. Guidance and counseling will be available to the student throughout his education.

4. Must have sufficient mathematics to make success in the course of study likely.

5. Must be in acceptable condition of physical and mental health.

6.A personal interview is required.

ADMISSION PROCEDURE

1. Submit completed application.

2. Have transcripts of all previous education mailed to the Institute.

3. Satisfy admission test requirements.

4. Submit medical form to the Institute.

5. Come to the school for personal interview and additional testing when asked to do so.

*See page 144 in the General Adult Education Section of this catalogue for details about the high school equivalency certificate.

AUTOMOTIVE BODY REPAIR

The curriculum at Cape Fear Technical Institute in Automotive Body Repair devotes much of its time in the shop to learning of necessary skills and practicing of these skills on body components. Every attempt is made to make these practical experiences as similar to on-the-job practices as possible. A graduate from this curriculum will receive a certificate.

AUTOMOTIVE BODY REPAIR

SUGGESTED SEQUENCE OF REQUIRED COURSES FOR AUTOMOTIVE BODY REPAIR

COURSE TITLE	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
AUT 1111—Auto Body Repair I	4	12	8
WLD 1101—Basic Gas Welding	0	6	4
AUT 1115—Trim, Glass and Radiator Repair	2	6	4
	6	24	14
SECOND QUARTER			
AUT 1112—Auto Body Repair II	3	12	7
WLD 1105—Auto Body Welding	0	6	2
AUT 1113—Metal Finishing and Painting	3	6	5
	6	24	14
THIRD QUARTER			
AUT 1114—Body Shop Applications	3	15	8
AUT 1123—Automotive Chassis and Suspension Systems	3	9	6
	6	24	14

COURSE DESCRIPTIONS

FIRST QUARTER

Aut 1111—Auto Body Repair I: Basic principles of automobile construction, design and manufacturing are covered in the beginning of the course. A thorough study is made of angles, crown and forming of steel into the contour of the present-day vehicles. The practical application is to have the student apply the first principles of straightening, aligning and painting of damaged areas.

Prerequisite: None

Wld 1101—Basic Gas Welding: Welding demonstrations by the instructor and practice by students in the oxy-acetylene welding shop. Safe and correct methods of assembling and operating the welding equipment are emphasized. Practice is given in surface welding, bronze welding, silver-soldering and flame cutting methods applicable to mechanical repair work.

Prerequisite: None

Aut 1115—Trim, Glass and Radiator Repair: Principles of removal and installation of all phases of interior trim are applied. Cutting, sewing and installing headlinings, seat covers and door trim panels are covered in class and in their practical application. Glass removal, cutting, fitting and installation are covered in detail. A thorough knowledge of the engine cooling system, a study of repairs made necessary by accident to the system and testing to insure normal engine cooling operation are emphasized. Advanced painting of trim parts and accessories requiring extreme care and skill is included in the course.

Prerequisite: None

SECOND QUARTER

Aut 1112—Auto Body Repair II: A thorough study of the requirements of a metal worker, the use of essential tools, forming fender flanges and beads, and straightening typical damage. It is here that the student begins acquiring skills, learning dexterity in shaping angles, crowns and contour of the metal of the body and fenders. More difficult types of metal working and painting are assigned.

Prerequisite: Aut 1111

Wld 1105—Auto Body Welding: Welding practices on material applicable to the installation of body panels and repairs to doors, fenders and deck lids. The students runs beads, does butt and fillet welds and performs all tests to detect strength and weaknesses of welded joints. Safety procedures are emphasized throughout the course.

Prerequisite: None

Aut 1113—Metal Finishing and Painting: The development of the skills of shrinking stretched metal, soldering and leading and preparing metal for the painter. Straightening of doors, hoods and deck lids and fitting and aligning are emphasized. Refinishing includes painting of fender or panel, spot repairs, and complete vehicle painting. The use and application of required power tools complete this phase.

Prerequisite: None

THIRD QUARTER

Aut 1114—Body Shop Applications: Application of all phases of training. Methods of removing and installing interior trim; painting of trim parts and accessories. Glass removal and installation. Repairing and replacing damaged cooling system components. Repair order writing, parts purchasing, estimates of damage, and developing the final settlement with the adjuster.

Prerequisite: None

Aut 1123—Automotive Chassis and Suspension Systems: Principles and functions of the components of automotive chassis. Practical job instruction in adjusting and repairing of suspension and steering systems. Units to be studied: shock absorbers, springs, steering systems, steering linkage, and front end alignment.

Prerequisite: None

AUTOMOTIVE MECHANICS

This curriculum provides a training program for developing the basic knowledge and skills needed to inspect, diagnose, repair or adjust automotive vehicles. Manual skills are developed in practical shop-work. Thorough undrstanding of the operating principles involved in the modern automobile comes in class assignments, discussion, and shop practice.

Complexity in automotive vehicles increases each year because of scientific discovery and new engineering. These changes are reflected not only in passenger vehicles, but also in trucks, buses and a variety of gasoline-powered equipment. This curriculum provides a basis for the student to compare and adapt to new techniques for servicing and repair as vehicles are changed year by year.

Automobile mechanics maintain and repair mechanical, electrical, and body parts of passenger cars, trucks, and buses. In some communities and rural areas they also may service tractors or marine engines and other gasoline-powered equipment. Mechanics inspect and test to determine the cause of faulty operation. They repair or replace defective parts to restore the vehicle or machine to proper operating condition. They use shop manuals and other technical publications.

Automotive mechanics in smaller shops usually are general mechanics qualified to perform a variety of repair jobs. A large number of automobile mechanics specialize in particular types of repair work. For example, some may specialize in repairing only power steering and power brakes, or automatic transmissions. Usually such specialists have an all-round knowledge of automotive repair and may occasionally be called upon to do other types of work.

AUTOMOTIVE MECHANICS

		Hours Per Week		Quarter Hours
FIRST QUARTER		**Class**	**Lab**	**Credit**
PME	1101—Internal Combustion Engines	3	15	8
MAT	1101—Applied Mathematics	5	0	5
ENG	1101-C—Communication Skills	2	0	2
PHY	1101—Applied Science	2	3	3
		12	18	18
SECOND QUARTER				
PME	1102—Engine Electrical and Fuel Systems	5	15	10
ENG	1102-C—Communication Skills	2	0	2
AUT	1126—Schematics & Diagrams: Automotive	0	3	1
PHY	1102—Applied Science	2	3	3
		9	21	16
THIRD QUARTER				
AUT	1120—Automotive Analysis	3	6	5
AUT	1123—Auto. Chassis & Suspension Systems	3	9	6
AUT	1121—Braking Systems	3	3	4
PSY	1101—Human Relations	3	0	3
		12	18	18
FOURTH QUARTER				
AUT	1124—Automotive Power-Train Systems	3	9	6
AUT	1125—Automotive Servicing	3	9	6
BUS	1103—Small Business Operations	3	0	3
WLD	1101—Basic Welding	0	3	1
		9	21	16

AUTOMOTIVE MECHANICS

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Pme 1101—Internal Combustion Engines: Development of a thorough knowledge and ability in using, maintaining, and storing the various hand tools and measuring devices needed in engine repair work. Study of the construction and operation of components of internal combustion engines. Testing of engine performance servicing and maintenance of pistons, valves, cams and camshafts, fuel and exhaust systems, cooling systems; proper lubrication, and methods of testing, diagnosing and repairing.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Eng 1101-C—Communication Skills: The first of two courses designed to improve the student's abilities in all areas of communications. Emphasis during the first quarter will be placed on the development of improved reading habits and basic composition skills.
Prerequisite: None

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

SECOND QUARTER

Pme 1102—Engine Electrical and Fuel Systems: A thorough study of the electrical and fuel systems of the automobile. Battery cranking mechanism, generator, ignition, accessories and wiring; fuel pumps, carburetors, and fuel injectors. Characteristics of fuels, types of fuel systems, special tools, and testing equipment for the fuel and electrical system.
Prerequisite: Pme 1101

Eng 1102-C—Communication Skills: A continuation of Eng 1101. In addition to reading and writing, the principles of effective speech will be practiced. Writing practice will include the filling out of job applications, composing personal history, statements, writing request for references, and then procedures related to job acquisition.
Prerequisite: Eng 1101-C

Aut 1126—Schematics & Diagrams: Automotive: Interpretation and reading of manufacturing diagrams. Development of ability to read and interpret blueprints, charts, instruction and service manuals, and wiring diagrams. Information on the basic principles of lines, views, dimensioning procedures, and notes.
Prerequisite: None

Phy 1102—Applied Science: The second in a series of two courses of applied physical principles. Topics introduced in this course are heat and thermometry, and principles of force, motion, work, energy, and power.
Prerequisite: Phy 1101

THIRD QUARTER

Aut 1120—Automotive Analysis: An analytical approach to trouble shooting and preventive maintenance through the use of mechanical equipment, electronic instrumentation, and visual inspection. Students will train on various electronic analysis equipment, chassis dynamometer, combustion analyzer, etc., for proper trouble shooting diagnosis. Students will be instructed in procedures to be followed in trouble shooting analysis of an internal combustion engine, brakes, steering and suspension, electrical circuits and drive lines.
Prerequisite: None

Aut 1123—Automotive Chassis and Suspension Systems: Principles and functions of the components of automotive chassis. Practical job instruction in adjusting and repairing of suspension, and steering systems. Units to be studied will be shock absorbers, springs, steering systems, steering linkage, front alignment, and safety factors involved.
Prerequisite: Pme 1102

Aut 1121—Braking Systems: A complete study of various braking systems employed on automobiles and lightweight trucks. Emphasis is placed on how they operate, proper adjustment and repair and safety factors involved.
Prerequisite: Phy 1102

Psy 1101—Human Relations: A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationships within the work situation.
Prerequisite: None

FOURTH QUARTER

Aut 1124—Automotive Power Train Systems: Principles and functions of automotive power train systems: clutches, transmission gears, torque converters, drive shaft assemblies, rear axles and differentials. Identification of troubles, servicing, and repair.
Prerequisite: Aut 1123

Aut 1125—Automotive Servicing: Emphasis is on the shop procedures necessary in determining the nature of troubles developing in the various component systems of the automobile. Troubleshooting of automotive systems, providing a full range of experiences in testing, adjusting, repairing and replacing.
Prerequisites: Aut 1123, Aut 1121

Bus 1103—Small Business Operations: An introduction to the business world, problems of small business operation, basic business law, business forms and records, financial problems, ordering and inventorying, layout of equipment and offices, methods of improving business, and employer-employee relations.
Prerequisite: None

Wld 1101—Basic Welding: Welding demonstrations by the instructor and practice by students in the welding shop. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding; bronze welding, silver-soldering, and flame-cutting methods applicable to mechanical repair work.
Prerequisite: None

DRAFTING — MECHANICAL

This curriculum is designed to prepare students to enter the field of mechanical drafting. The first two quarters contain courses basic to all fields of drafting. The third and fourth quarters contain specialization and related courses that prepare one to enter mechanical drafting occupations.

Each course is prepared to enable an individual to advance rapidly in drafting proficiency upon entering the field of work. Courses are arranged in sequence to develop drafting skills and proficiency in mathematics and science. The draftsman associates with many levels of personnel — administrative, architects, engineers, skilled workmen — and must be able to communicate effectively with them. Courses to develop knowledge and skills in communication, human relations, economics and industrial organization are provided to assist the student in developing understanding and confidence in his relations with other persons.

A draftsman prepares clear, complete, and accurate working plans and detail drawings, from rough or detailed sketches or notes for engineering or manufacturing purposes, according to the specified dimensions: makes final sketch of the proposed drawing, checking dimension of parts, materials to be used, the relation of one part to another, and the relation of the various parts to the whole structure. Makes any adjustments or changes necessary or desired. Inks in lines and letters on pencil drawings as required. Exercises manual skill in the manipulation of triangle, T-square, and other drafting tools. Lays tracing paper on drawing and traces drawing in pencil or ink. Makes charts for representation of statistical data. Makes finished designs from sketches. Utilizes knowledge of various machines, engineering practices, mathematics, building materials, and other physical sciences to complete the drawings.

A mechanical draftsman performs the general duties of a draftsman and also specializes in making rough drafting sketches of proposed mechanical devices, and then drawing necessary details. Prepares accurate drawings of parts or machines from specifications.

DRAFTING — MECHANICAL

		Hours Per Week		Quarter Hours
FIRST QUARTER		Class	Lab	Credit
DFT	1121—Drafting	3	15	8
MAT	1101—Applied Mathematics	5	0	5
ENG	1101-C—Communication Skills	2	0	2
PHY	1101—Applied Science	2	3	3
		12	18	18
SECOND QUARTER				
DFT	1122—Drafting	3	15	8
MAT	1102—Applied Mathematics	5	0	5
ENG	1102-C—Communication Skills	2	0	2
PHY	1102—Applied Science	2	3	3
		12	18	18
THIRD QUARTER				
DFT	1131—1131—Mechanical Drafting	3	12	7
MAT	1104—Trigonometry	3	0	3
PSY	1101—Human Relations	3	0	3
MEC	1113—Shop Processes	1	3	2
MEC	1115—Applied Metallurgy	2	3	3
		12	18	18
FOURTH QUARTER				
DFT	1132—Mechanical Drafting	3	12	7
MEC	1114—Shop Processes	1	3	2
MEC	1116—Applied Metallurgy	2	3	3
BUS	1105—Industrial Organization	3	0	3
MAT	1124—Slide Rule	3	0	3
		12	18	18

DRAFTING — MECHANICAL

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Dft 1121—Drafting: An introduction to drafting and the study of drafting practices. Instruction is given in the selection, use and care of instruments, singlestroke lettering, applied geometry, freehand sketching consisting of orthographic and pictorial drawings. Orthographic projection, reading and instrument drawing of principal views, single auxiliary views (primary), and double (oblique) auxiliary views will be emphasized. Dimensioning and note practices will be studied with reference to the American Standards Association practices. Methods of reproducing drawings will be included at the appropriate time.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Eng 1101-C—Communication Skills: The first of two courses designed to improve the student's abilities in all areas of communications. Emphasis during the first quarter will be placed on the development of improved reading habits and basic composition skills.
Prerequisite: None

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement: properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

SECOND QUARTER

Dft 1122—Drafting: The trainee will study simple and successive revolutions and their applications to practical problems. Sections and conventions will be studied and both detail and assembly sections will be drawn. Intersections and developments will be studied by relating the drawing to the sheet metal trades. Models of the assigned drawings will be made from construction paper, cardboard, or similar materials as a proof of the solution to the problems drawn. Methods of drawing and projected axonometric, oblique, and perspective drawings will be studied with emphasis on the practical applications of pictorial drawings. Various methods of shading will be introduced and dimensioning and sectioning of oblique and axonometric pictorials will be done.
Prerequisite: Dft 1121

Mat 1102—Applied Mathematics: Basic concepts and operations of algebra: historical backgrounds of our base-10 number system; algebraic operations; addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.
Prerequisite: Mat 1101

Eng 1102-C—Communication Skills: A continuation of Eng 1101. In addition to reading and writing, the principles of effective speech will be practiced. Writing practice will include the filling out of job applications, composing personal history, statements, writing request for references, and then procedures related to job acquisition.
Prerequisite: Eng 1101-C

Phy 1102—Applied Science: The second in a series of two courses of applied physical principles. Topics introduced in this course are heat and thermometry, and principles of force, motion, work, energy, and power.
Prerequisite: Phy 1101

THIRD QUARTER

Dft 1131—Mechnical Drafting: A continuation of mechanical drafting beginning with problems concerning precision and limit dimensioning. Methods of fastening materials, and fasteners: keys, rivets, springs, and welding. Symbols will be studied and drawings will be made involving these items. Principles of design will be introduced with the study of basic mechanisms of motion transfer; gears, cams, power trains, pulleys, belting and methods of specifying and calculating dimensions will be studied. Drawings will be made involving these mechanisms.
Prerequisite: Dft 1122

Mat 1104—Trigonometry: Trigonometric ratios; solving problems with right triangles, using tables, and interpolating; solution of oblique triangles using law of sines and law of cosines; graphs of the trigonometric functions; inverse functions, trigonometric equations. All topics are applied in practical problems.
Prerequisites: Mat 1101, Mat 1102

Psy 1101—Human Relations: A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationship within the work situation.
Prerequisite: None

Mec 1113—Shop Processes: Study of practices used in metalworking shops: introduction to how materials can be utilized, and to the processes of shaping, forming and fabricating of metals. Demonstration of the metalworking lathes, grinders, drills, milling machines, shapers, planers, saws, broachers, gear-cutting machines and finishing machines. A study of the capabilities of these machines.
Prerequisite: None

Mec 1115—Applied Metallurgy: Investigates the properties of ferrous metals and tests to determine their uses. Instructions will include some chemical metallurgy to provide a background for the understanding of the physical changes and causes of these changes in metals. Physical metallurgy of ferrous metals, producing iron and steel, theory of alloys, shaping and forming, heat treatments for steel, surface treatments, alloy of special steel, classification of steels, and cast iron will be topics for study.
Prerequisite: None

FOURTH QUARTER

Dft 1132—Mechanical Drafting: Principles of design sketching, design drawings, layout drafting, detailing from layout drawings, production drawings and simplified drafting practices constitute areas of study. Forging and casting drawings will be made from layouts. Specifications, parts list and bill of materials are emphasized in this course. The student will develop a complete set of working drawings of a tool, jig, fixture or simple machine and learn principles of design, handbook and manual usage.
Prerequisite: Dft 1131

Mec 1114—Shop Processes: Comparison of the unit-production and mass-production systems. Casting, forging and allied processes, welding and sheet metal working processes are demonstrated and discussed. Mass-production methods are studied in relationship to precision dimensional control.
Prerequisite: Mec 1113

Mec 1116—Applied Metallurgy: Continuation of the study of physical metallurgy. The non-ferrous metals; bearing metals (brass, bronze, lead), light metals (aluminum and magnesium) and copper and its alloys are studied. Powder metallurgy, titanium, zirconium, indium and vanadium are included in this course.
Prerequisite: Mec 1115

Bus 1105—Industrial Organizations: Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None

Mat 1124—Slide Rule: An introductory slide rule course starting with multiplication and division going into more complicated mathematics. Students will also master the use of a slide rule in calculating squares and square roots, cubes and cube roots, and reciprocals.

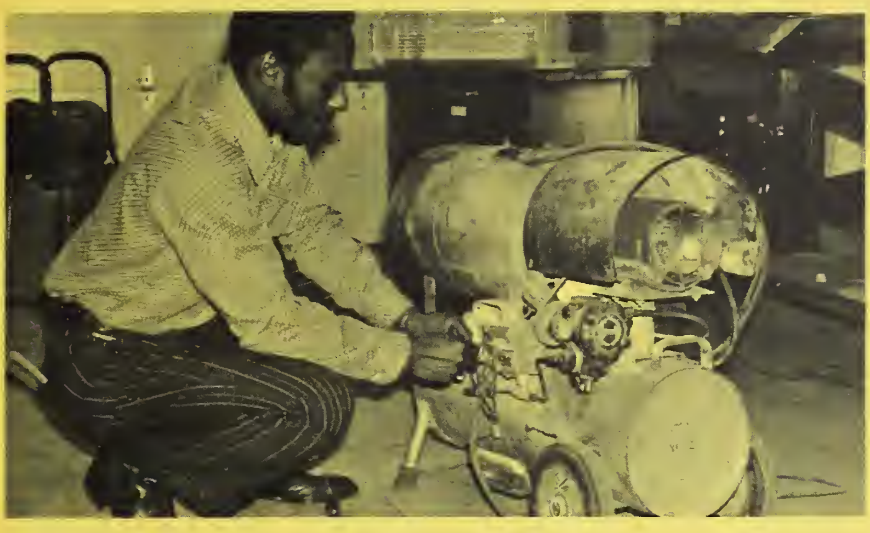
HEATING AND AIR CONDITIONING

Through this curriculum the Cape Fear Technical Institute provides a training program for the instruction of students in the basic knowledges and skills involved in servicing and installing heating and air conditioning equipment. Manual skills are emphasized in practical shop work combined with a thorough understanding of the operating principles involved in heating and air conditioning.

The heating and air conditioning industry is one of the fastest growing fields today. With the ever-increasing use of air conditioning in industries and the even faster growing use of air conditioning and heating systems in domestic use, the need for service people to install and maintain this equipment has surpassed the available supply of trained personnel. This need for trained people has become so great that a program for training is necessary. Because of the increasing engineering complexity caused by the demand for more efficient, more compact, and dual capacity units, this curriculum to train people and to upgrade present-day servicemen has been prepared.

In North Carolina a contractor in the heating and air conditioning field is required by law to hold a state license. The serviceman or mechanic is not required to hold a license. The material presented herein is basic to the passing of this state's license examination. With job experience, a graduate should be able to successfully pass the examination and acquire a contractor's license.

The heating and air conditioning mechanic installs, services and repairs equipment used in the heating and cooling of domestic buildings, industrial buildings and mobile-type units. In general, a person will perform similar duties in any one of these fields, but often becomes a specialist in one. The mechanic uses blueprints and schematics, thus requiring a knowledge of blueprint reading. He services, installs, and maintains cooling components, heating devices, air and liquid flow devices used in comfort heating of air and liquids, and fuel storage units. The duties may involve mechanical repairs, electrical motor repairs, control wiring, electrical and gas tests, pipe and tubing fitting, duct and fitting fabrication, equipment installation, shop sketching of equipment and flow devices for installations, and equipment sizing.



HEATING AND AIR CONDITIONING

		Hours Per Week		Quarter Hours
FIRST QUARTER		**Class**	**Lab**	**Credit**
AHR	1116—Oil Burner Installation and Service	4	6	6
MAT	1101—Applied Mathematics	5	0	5
ELC	1102-C—Applied Electricity—Part I	3	0	3
DFT	1104-C—Blueprint Reading	0	2	1
AHR	1121-C—Principles of Refrigeration—Part I	3	2	4
		15	10	19
SECOND QUARTER				
AHR	1117—Gas Burners, Electric Heat & Liquid Heat Applications	4	3	5
AHR	1125—Principles of Refrigeration—Part II	3	6	5
ELC	1103-C—Applied Electricity—Part II	2	0	2
DFT	1116-C—Blueprint Reading: Air Conditioning	2	2	3
WLD	1102—Basic Gas Welding	0	3	1
		11	14	16
THIRD QUARTER				
AHR	1124-C—Air Conditioning Service	3	8	6
PHY	1101—Applied Science	3	0	3
AHR	1123—Principles of Air Conditioning	2	4	4
MAT	1102—Applied Mathematics	5	0	5
		13	12	18
FOURTH QUARTER				
AHR	1126—All Year Comfort Systems	3	9	6
AHR	1109—Job Planning and Estimating	2	0	2
PSY	1101—Human Relations	2	0	2
AHR	1128—Automatic Controls	3	6	5
		10	15	15

HEATING AND AIR CONDITIONING

COURSE DESCRIPTION BY QUARTERS

FIRST QUARTER

Ahr 1116—Oil Burner Installation and Service: An introduction to the principle of heating, terminology, and the use and repair of equipment. Also included will be maintenance and service of heating units and diagnosing troubles within installation. Thermostat controls are also a part of this course.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Elc 1102-C—Applied Electricity (Part I): The use and care of test instruments and equipment used in servicing electrical apparatus for air conditioning and refrigeration equipment. Included will be transformers, various types of motors ng of the various electrical devices used in air conditioning, heating, and refrgeration equipment. Included will be transformers, various types of motors and starting devices, switches, electrical heating devices and wiring.
Prerequisite: None

Dft 1104-C—Blueprint Reading: Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.
Prerequisite: None

Ahr 1121-C—Principles of Refrigeration (Part I): An introduction to the principles of refrigeration, terminology, the use and care of tools and equipment, and the identification and the function of the component parts of a system. Other topics to be included will be the basic laws of refrigeration; characteristics, and comparison of the various refrigerants; the use and construction of valves, fittings, and basic controls. Practical work includes tube bending, flaring and soldering. Standard procedures and safety measures are stressed in the use of special refrigeration service equipment and the handling of refrigerants.
Prerequisite: None

SECOND QUARTER

Ahr 1117—Gas Burners, Electric Heat and Liquid Heat Applications: An introduction to the principles of heating with the use of gas, electric, or liquid heat units. The course includes installation and service to the above forms of heating units. The course will also include servicing and corrective maintenance techniques as it applies to the above three forms of heating units.
Prerequisite: None

Ahr 1125—Principles of Refrigeration (Part II): A continuation and more advanced study in refrigeration principles.
Prerequisite: AHR 1121-C

Elc 1103-C—Applied Electricity (Part II): The use and care of test instruments and equipment used in servicing electrical apparatus for air conditioning and refrigeration installations. Electrical principles and procedures for troubleshootng of the various electrical devices used in air conditioning, heating and refrigeration equipment. Included will be transformers, various types of motors and starting devices, switches, electrical heating devices and wiring.
Prerequisite: Elc 1102-C

Dft 1116-C—Blueprint Reading: Air Conditioning: A specialized course in drafting for the heating and air conditioning student. Emphasis will be placed on reading of blueprints that are common to the trade; blueprints of mechanical components, assembly drawings, wiring diagrams and schematics, floor plans, heating system plans including duct and layout air conditioning systems.
Prerequisite: Dft 1104

Wld 1102—Basic Gas Welding: Welding demonstrations by the instructor and practice by the students in the welding shop. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding; bronze welding, silver-soldering, and flame-cutting methods applicable to mechanical repair work.
Prerequisite: None

THIRD QUARTER

Ahr 1124-C—Air Conditioning Servicing: Emphasis is placed on the installation, maintenance, and servicing of equipment used in the cleaning, changing, humidification and temperature control of air in an air conditioned space. Installation of various ducts and lines needed to connect various components is made. Shop work involves controls, testing and adjusting of air conditioning equipment, and location and correction of equipment failure.
Prerequisite: None

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

Ahr 1123—Principles of Air Conditioning: Emphasis is placed on the installation, maintenance, and servicing of equipment used in the cleaning, changing, humidification and temperature control of air in an air conditioned space. Installation of various ducts and lines needed to connect various components is made.
Prerequisite: None

Mat 1102—Applied Mathematics: Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations; addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.
Prequisite: Mat 1101

FOURTH QUARTER

Ahr 1126—All Year Comfort Systems: Auxiliary equipment used in conjunction with refrigeration systems to provide both heating and cooling for "all year" comfort will be studied and set up in the laboratory. Included will be oil fired systems, gas fired systems, water circulating systems, and electric-resistance systems. Installation of heat pumps will be studied along with servicing techniques. Reversing valves, special types of thermostatic expansion valves, systems of de-icing coils, and electric wiring and controls are included in the study.
Prerequisite: None

Ahr 1109—Job Planning and Estimating: Estimating loads and capacity of refrigeration and cooling units through the use of manuals, tables, and charts. Students will be expected to acquire sufficient knowledge to determine and recommend the adequate sizing of cooling units for specific uses either in homes or industry.

Prerequisite: Mat 1101

Psy 1101—Human Relations: A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationship within the work situation.

Ahr 1128—Automatic Controls: The study of various control thermostat systems used by manufacturers for the installation of their equipment. This course includes resetting and calibrating of control units used on the various heating systems. The principles of how these controls work is also discussed.

Prerequisite: None

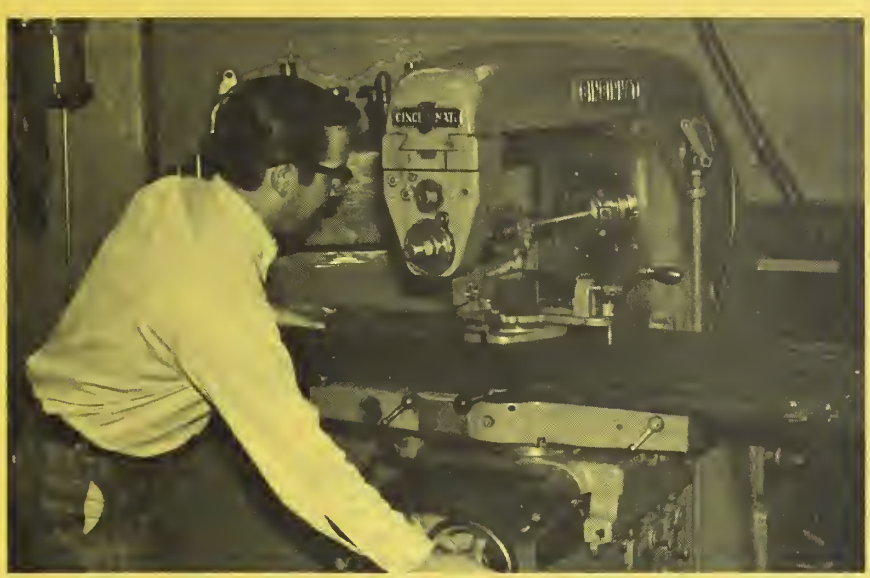
MACHINE TRADES

This curriculum was prepared to meet a definite need for training of machinists. Surveys recently completed in North Carolina show that many of the existing industries lack time and facilities for training enough machinists to meet present and planned needs. Expanding industries already located in our State and new industries under development invariably express the need for skilled craftsmen who have the background knowledge and potential to advance.

This guide is designed to give learners the opportunity to acquire basic skills and the related technical information necessary to gain employment and build a profitable career in the machine shop industry in the State. It is comprised of the joint views of committes responsible for its development.

The machinist is a skilled metal worker who shapes metal parts by using machine tools and hand tools. His training and experience enable him to plan and carry through all the operations needed in turning out a machined product and to switch readily from one kind of product to another. A machinist is able to select the proper tools and material required for each job and to plan the cutting and finishing operations in their proper order so that he can complete the finished work according to blueprint or written specifications. He makes standard shop computations relating to dimensions of work, tooling, feeds, and speeds of machining. He often uses precision measuring instruments such as micrometers and gauges to measure the accuracy of his work to thousandths of an inch.

This skilled worker must be able to set up and operate most types of machine tools. The machinist also must know the composition of metals so that he can heat and quench cutting tools and parts to improve machinability. His wide knowledge enables him to turn a block of metal into an intricate, precise part.



MACHINE TRADES

		Hours Per Week		Quarter Hours
FIRST QUARTER		**Class**	**Lab**	**Credit**
MEC	1101—Machine Shop Theory & Practice	3	15	8
ENG	1101-C—Communication Skills	2	0	2
MAT	1101—Applied Mathematics	5	0	5
DFT	1104—Blueprint Reading	2	3	3
		12	18	18
SECOND QUARTER				
MEC	1102—Machine Shop Theory & Practice	3	15	8
MAT	1102—Applied Mathematics	5	0	5
DFT	1105—Blueprint Reading	0	3	1
WLD	1101—Basic Welding	1	3	2
		9	21	16
THIRD QUARTER				
MEC	1103—Machine Shop Theory & Practice	1	18	7
MAT	1106—Applied Mathematics	3	0	3
DFT	1106—Blueprint Reading	0	3	1
MEC	1115-C—Applied Metallurgy	3	0	3
ENG	1102-C—Communication Skills	2	0	2
		9	21	16
FOURTH QUARTER				
MEC	1104—Machine Shop Theory & Practice	2	15	7
MEC	1116—Applied Metallurgy	0	3	1
MAT	1123—Machinist Mathematics	5	0	5
PHY	1101—Applied Science	2	3	3
		9	21	16

MACHINE TRADES

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Mec 1101—Machine Shop Theory and Practice: An introduction to the machinist trade and the potential it holds for craftsmen. Deals primarily with the identification, care and use of basic hand tools and precision-measuring instruments. Elementary layout procedures and processes of lathe, drill press, grinding (off-hand) and milling machines will be introduced both in theory and practice.
Prerequisite: None

Eng 1101-C—Comunication Skills: The first of two courses designed to improve the student's abilities in all areas of communications. Emphasis during the first quarter will be placed on the development of improved reading habits and basic composition skills.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Dft 1104—Blueprint Reading: Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.
Prerequisite: None

SECOND QUARTER

Mec 1102—Machine Shop Theory and Practice: Advanced operations in layout tools and procedures, power sawing, drill press, surface grinder, milling machine shaper. The student will be introduced to the basic operations on the cylindrical grinder and will select projects encompassing all the operations, tools and procedures thus far used and those to be stressed throughout the course.
Prerequisite: Mec 1101

Mat 1102—Applied Mathematics: Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations; addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.
Prerequisite: Mat 1101

Dft 1105—Blueprint Reading: Further practice in interpretation of blueprints as they are used in industry; study of prints supplied by industry; making plans of operations; introduction to drafting room procedures; sketching as a means of passing on ideas, information and processes.
Prerequisite: Dft 1104

Wld 1101—Basic Welding: Welding demonstrations by the instructor and practice by students in the welding shop. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding, bronze welding, silver soldering, and flame-cutting methods applicable to mechanical repair work.
Prerequisite: None

THIRD QUARTER

Mec 1103—Machine Shop Theory and Practice: Advanced work on the engine lathe, turning, boring and threading machines, grinders, milling machine and shaper. Introduction to basic indexing and terminology with additional processes on calculating, cutting and measuring of spur, helical, and worm gears and wheels. The trainee will use precision tools and measuring instruments such as vernier height gages, protractors, comparators, etc. Basic exercises will be given on the turret lathe and on the tool and cutter grinder.
Prerequisite: Mec 1102

Mat 1106—Applied Mathematics: A continuation of Mat 1102 with the addition of fundamental formulas and equations dealing in areas of plane figures and volumes of solids. Geometric principles will be applied to shop operations.
Prerequisite: Mat 1102

Dft 1106—Blueprint Reading: Advanced blueprint reading and sketching as related to detail and assembly drawings used in machine shops. The interpretation of drawing of complex parts and mechanisms for features of fabrication, construction and assembly.
Prerequisite: Dft 1105

Mec 1115-C—Applied Metallurgy: Investigates the properties of ferrous metals and tests to determine their uses. Instructions will include some chemical metallurgy to provide a background for the understanding of the physical changes and causes of these changes in metals. Physical metallurgy of ferrous metals producing iron and steel, theory of alloys, shaping and forming, heat treatments for steel, surface treatments, alloy of special steel, classification of steels, and cast iron will be topics for study.
Prerequisite: None

Eng 1102-C—Communication Skills: A continuation of Eng 1101-C. In addition to reading and writing, the principles of effective speech will be practiced. Writing practice will include the filling out of job applcations, composing personal history, statements, writing request for references, and then procedures related to job acquisition.
Prerequisite: Eng 1101-C

FOURTH QUARTER

Mec 1104—Machine Shop Theory and Practice: Development of class projects using previously learned procedures in planning, blueprint reading, machine operations, final assembly and inspection. Additional processes on the turret lathe, tool and cutter grinder, cylindrical and surface grinder, advanced milling machine operations, etc. Special procedures and operations, processes and equipment, observing safety procedures faithfully and establishing of good work habits and attitudes acceptable to the industry.
Prerequisite: Mec 1103

Mec 1116—Applied Metallurgy: Continuation of the study of physical metallurgy. The non-ferrous metals: bearing metals (brass, bronze, lead), light metals (aluminum and magnesium), and copper and its alloys are studied. Powder metallurgy, titanium, zirmonium, indium and vanadium are included in this course.
Prerequisite: Mec 1115

Mat 1123—Machinist Mathematics: Introduces gear ratio, lead screw and indexing problems with emphasis on application to the machine shop. Practical applications and problems furnish the trainee with experience in geometric propositions and trigonometric relations to shop problems; concludes with an introduction to compound angle problems.
Prerequisite: Mat 1106

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and bases; basic electrical principles.
Prerequisite: None

MARINE DIESEL MECHANICS

Marine mechanics are in demand along the coastal waterways of North Carolina and other states where fishing and water recreation industries exist. This is a rapidly growing industry in many areas of the country. Single boat operations to large fleets exist for sport and commercial fishing and various recreational activities. These boats use propulsion systems ranging from one cylinder motors to large diesel units. These units require trained and skilled mechanics to maintain and service them for proper operation.

This program provides training for individuals interested in becoming mechanics to service and maintain the propulsion system for boats and various types of marine equipment. Manual skills in servicing marine equipment are developed in practical shop work. A thorough understanding of the operating principles of this equipment is provided through classroom instruction, laboratory experiments, group discussions and shop practice.

Marine engine mechanics maintain and repair mechanical, electrical, hydraulic, and pneumatic equipment used on boats and in industrial applications. Mechanics inspect and test to determine the causes of faulty operation; repair or replace defective parts to restore the machine or unit to proper operating condition; use shop manuals, manufacturer's maintenance manuals, and other technical publications.

Marine engine mechanics in smaller shops or self-employed persons usually are general mechanics qualified to perform a variety of repair jobs. A large number of marine engine mechanics specialize in particular types of repair work. For example, some may specialize in repairing only electrical equipment, or injector's servicing. Others specialize in clutches and power train equipment. Usually such specialists have an all-around knowledge of marine engine operation and may occasionally be called upon to do other types of work.

MARINE DIESEL MECHANICS

		Hours Per Week		Quarter Hours
FIRST QUARTER		Class	Lab	Credit
MDE	1101—Marine Diesel Engines Theory & Practice	5	10	8
MAT	1101—Applied Mathematics	5	0	5
PHY	1101—Applied Science	3	0	3
MEC	1101-C—Machine Shop Theory & Pracitce	2	3	3
ENG	1101-C—Communication Skills	2	0	2
		17	13	21
SECOND QUARTER				
MDE	1102—Marine Diesel Engines Theory & Practice	6	10	9
MAT	1102—Applied Mathematics	5	0	5
ELC	1112—Direct Current Electricity	1	3	2
DFT	1104—Blueprint Reading	0	3	1
ENG	1102-C—Communication Skills	2	0	2
		14	16	19
THIRD QUARTER				
MDE	1103—Marine Diesel Engines Theory & Practice	5	12	9
ELC	1113-C—Alternating and Direct Current Machines & Controls	1	3	2
WLD	1101—Basic Welding	1	3	2
MSC	1101—Safety at Sea	1	2	2
PSY	1101—Human Relations	2	0	2
		10	20	17
FOURTH QUARTER				
MDE	1104—Marine Diesel Engines Theory & Practice	5	12	9
ELC	1114-C—Motors, Generators and Controls	1	3	2
MEC	1102-C—Machine Shop Theory and Practice	0	6	2
BUS	1105—Industrial Organizations	3	0	3
		9	21	16

MARINE DIESEL MECHANICS

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Mde 1101—Marine Diesel Engines Theory & Practice: Principles of main propulsion of vessels employing internal combustion engines. Construction and various designs of the operational principles of two- and four-cycle internal combustion engines and their delated piping systems, cooling, fueling and lubrication. Study of the power train components, clutch, reduction gears, reverse gears, coupling, line shafting, and propellers. Procedures for "lighting off" operation, testing and recording engine performance, and servicing in a planned preventive maintenance program through periodic and recorded inspections. Principles of ventilation and heating of vessels, and the basic principles of steam generation where such method is employed as a medium of heating for comfort as well as providing fresh water.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

Mec 1101-C—Machine Shop Theory and Practice: An introduction to the machinist trade and the potential it holds for craftsmen. Deals primarily with the identification, care and use of basic hand tools and precision-measuring instruments. Elementary layout procedures and processes of lathe, drill press, grinding (off-hand) and milling machines will be introduced both in theory and practice.
Prerequisite: None

Eng 1101-C—Communication Skills: The first of two courses designed to improve the student's abilities in all areas of communications. Emphasis during the first quarter will be placed on the development of improved reading habits and basic composition skills.
Prerequisite: None

SECOND QUARTER

Mde 1102—Marine Diesel Engines Theory and Practice: Diesel engines and related auxiliaries and their relationship to the engineering plant and their application for operating various shipboard systems. Theory of filling, storage, purification, transfer of fuels, lubricants, water, and study of the various piping systems and their maintenance. Operation of pumps for fire system, drainape, main and secondary, and of their importance in maintaining stability and trim of the vessel.
Prerequisite: Mde 1101

Mat 1102—Applied Mathematics: Basic concepts and operations of algebra; historical background of our base-10 number systems; algebraic operations; addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.
Prerequisite: Mat 1101

Elc 1112—Direct Current Electricity: Basic electricity subjects include: structure of matter, electrical terminology and symbols, electron theory of current flow, magnets and magnet fields. Rigorous mathematical analysis of direct current resistive circuits. Ohm's Law, Kirchoff's Laws, Thevenin's Theorem, Norton's Theorem, the Superposition Principle and loop current method. Solution of complex resistive networks. Fundamental principles of inductors, capacitors, and time constants circuits are introduced.
Prerequisite: None

Dft 1104—Blueprint Reading: Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.
Prerequisite: None

Eng 1102-C—Communication Skills: A continuation of Eng 1101-C. In addition to reading and writing, the principles of effective speech will be practiced. Writing practice will include the filling out of job applications, composing personal history, statements, writing request for references, and then procedures related to job acquisition.
Prerequisite: Eng 1101-C

THIRD QUARTER

Mde 1103—Marine Diesel Engines Theory and Practice: Principles of operation of diesel generator plants and their application and operation in the production of electrical power for propulsion, steerage, internal communications, deck machinery, refrigerating plants, and the production of fresh water employing the electrical vapor distilling process of evaporation.
Prerequisites: Mde 1101 and Mde 1102

Elc 1113-C—Alternating and Direct Current Machines and Controls: Provides fundamental concepts in single and polyphase alternating current circuits, voltages, currents, power measurements, transformers, and motors. Instruction in the use of electrical test instruments in circuits analysis. The basic concepts of AC and DC machines and simple system controls. An introduction to the type control used in small appliances, such as: thermostats, timers, or sequencing switches.
Prerequisite: None

Wld 1101—Basic Welding: Welding demonstrations by the instructor and practice by students in the welding shop. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding; bronze welding, silver-soldering, and flame-cutting methods applicable to mechanical repair work.
Prerequisite: None

Msc 1101—Safety at Sea: Consists not only of medical first aid, but also various life-saving drills held aboard ship, i.e. life-boat drill, fire-fighting drills, man overboard, etc. The fundamentals of anatomy and physiology are covered to enable the students to understand medical first aid basics such as compression points for the application of tourniquets for stopping the flow of blood. A comprehensive study of the symptoms and treatment of diseases are discussed. How to tend and nurse patients at sea, how to maintain a ship's hospital, and an understanding of the use of all the first aid equipment carried in the ship's medicine locker. Methods used to attain a high degree of ship sanitation. This includes handling of food, preparation of food, storage of food, upkeep of toilets and living quarters, disposal of garbage, and other wastes, and control of vermin and other disease-carrying pests. The importance of excellent standards of personal hygiene aboard ship. A practical study of various resuscitation equipment, oxygen-breathing apparatus, smoke masks, safety slings and stretchers.
Prerequisite: None

Psy 1101—Human Relations: A study of basic principles of behavior. The problems of the individual are studied in relation to society, group membership, and relationships within the work situation.
Prerequisite: None

FOURTH QUARTER

Mde 1104—Marine Diesel Engines Theory and Practice: The administration of Marine Engineering plants, through the recording and filling of performance data. Processing, recording, and storage of parts for the preventive maintenance program, and periodic inspections of machinery and component parts through the use of precision tools to determine conditions due to wear, and the replacement of such components in conference with recommended standards set forth by the manufacturer.
Prerequisites: Mde 1101, Mde 1102, Mde 1103

Elc 1114-C—Motors, Generators and Controls: A study of the fundamental concepts of AC and DC motors, generators and control of simple systems. Includes thermostats, timers, sequencing switches, etc.
Prerequisite: None

Mec 1102-C—Machine Shop Theory and Practice: Advanced operations in layout tools and procedures, power sawing, drill press, surface grinder, milling machine shaper. The student will be introduced to the basic operations on the cylindrical grinder and will select projects encompassing all the operations, tools and procedures thus far used.
Prerequisite: Mec 1101

Bus 1105—Industrial Organization: Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None

OPERATING ROOM ASSISTANT

With more new hospitals being built, and the rapid advancement in Surgical Techniques there is an increasing demand for more well-trained personnel in the Operating Room area.

The aim of the Operating Room Assistant Course is to make available to qualified persons the opportunity to prepare themselves to function intelligently under the direct and continuous supervision of qualified professional nurses in hospital areas which are concerned with principles and practices of Surgical Aseptics in Operating Rooms, Delivery Rooms, and Central Service Department.

Students are selected on the basis of demonstrated aptitude for O.R. Assistants as determined by pre-entrance tests, interviews with faculty members, including Surgeons, High School record, character references, and medical reports.

During the six-months course the student is expected to grow continuously in acquisition of knowledge and understanding, related to Operating Room Technique, Basic Anatomy, Physiology, Basic Microbiology, Aseptics, Communication Skills, Inter-personal relationship, and the use of good judgment. Evaluation of student performance consists of tests on all phases of course content, evaluation of clinical performance, and evaluation of adjustment to the responsibilities that is expected of an Operating Room Assistant. A passing score is required on all graded work, plus demonstrated progress in the clinical area of the Operating Room.

Students completing this Operating Room Assistant Course will be qualified to work in the Operating Room and assist the doctor or surgeon while under the supervision of the professional nurse.

OPERATING ROOM ASSISTANT

Course Title	Hours Per Week Class	Lab	Quarter Hours Credit
FIRST QUARTER			
ORA 1101 Operating Room Assistant I	12	9	15
SECOND QUARTER			
ORA 1102 Operating Room Assistant II	6	18	12

FIRST QUARTER

Ora 1101—Operating Room Assistant I: Basic Anatomy and Physiology of the human body, which consist of the nerves, muscles, bones, blood vessels and the different systems of the body. Basic Microbiology which consists of the many different microorganisms or "germs" and how they effect our body. Ethics and communications will be taught in this quarter.

Lab.—Some introduction into the Operating Room in observing the actual working of this area.

SECOND QUARTER

Ora 1102—Operating Room Assistant II: Operating Room technique as related to actual practice scrubbing and setting up for operations. Learning the instruments and packs, how they are set-up and autoclaved or sterilized. Scrubbing in with a nurse and assisting with operations. Learning the basic principles of Sterile Technique as a Scrubbed Assistant or a Circulating Assistant. Ethics and communication skills will continue in this quarter.

Lab.—In the Operating Rooms and Central Sterile Service.

PRACTICAL NURSE EDUCATION

The accelerated growth of population in North Carolina and rapid advancement in medical technology demand an increased number of well-trained personnel for health services. Realizing this need, the State Department of Community Colleges, in conjunction with local hospitals, administers programs of practical nurse education in local systems, community colleges, technical institutes and in industrial education centers throughout the state.

The aim of the Practical Nurse Education Program is to make available to qualified persons the opportunity to prepare for participation in care of patients of all ages, in various states of dependency, and with a variety of illness conditions.

Students are selected on the basis of demonstrated aptitude for nursing as determined by pre-entrance tests, interviws with faculty mmbers, high school record (students in this program must be a high school graduate or the equivalent*), character references, and reports of medical and dental examination.

Throughout the one-year program the student is expected to grow continuously in acquisition of knowledge and understanding related to nursing, the biological sciences, the social sciences and in skills related to nursing practice, communications, interpersonal relations, and used of good judgment. Evaluation of student performance consists of tests on all phases of course content, evaluation of clinical performance, and evaluation of adjustment to the responsibilities of nursing. A passing score is required on all graded work, plus demonstrated progress in applicatoin of nursing skills to actual patient care.

Graduates of accredited programs of practical nurse education are eligible to take the licensing examination given by the North Carolina Board of Nursing. This examination is given twice each year, usually in April and September. A passing score entitles the individual to receive a license and to use a legal title "Licensed Practical Nurse." The license must be renewed annually. The Licensed Practical Nurse can apply for licensure in other states on the basis of a satisfactory examination score, without repeating the examination.

*See page 144 in general Adult Education Section for details about the high school equivalency certificate.

The LPN is prepared to function in a variety of situations: hospitals of all types, nursing homes, clinics, doctors' and dentists' offices and, in some localities, public health facilities. In all situations the LPN functions under supervision of a registered nurse and/or licensed physician. This supervision may be minimal in situations where the patient's condition is stable and not complex; or it may consist of continuous direction in situations requiring the knowledge and skills of the registered nurse or physician. In the latter situation, the LPN may function in an assisting role in order to avoid assuming responsibility beyond that for which the one-year program can prepare the individual.

Job requirements for the Licensed Practical Nurse include suitable personal characteristics, ability to adapt knowledge and understandings of nursing principles to a variety of situations, technical skills for performance of bedside nursing, appreciation for differences of people and for the worth of every individual, a desire to serve and help others, and readiness to conform to the requirements of nursing ethics and hospital policies.

PRACTICAL NURSE EDUCATION

CURRICULUM BY QUARTERS

Course Title	Hours Per Week			Quarter Hours
FIRST QUARTER	Class	Lab.	Clinic	Credit
Practical Nursing I	25	2	3	27
SECOND QUARTER				
Practical Nursing II	12	2	21	20
THIRD QUARTER				
Practical Nursing III	10	2	24	19
FOURTH QUARTER				
Practical Nursing IV	10	2	24	19

PRACTICAL NURSE EDUCATION

PRACTICAL NURSING I

FIRST QUARTER

OBJECTIVES: To assist beginning students in practical nursing to acquire basic knowledge from nursing and from related areas of learning and to begin to develop the skills needed for safe and effective bedside care of patients whose health deviation has created a state of dependency in matters of daily living.

Course Material:

Nutrition

Nursing Skills—Introduction to patient care.

Health—Personal, physical and mental; family; community.

Basic Science—Body structure and function; bacteriology.

Vocational Adjustments—Introduction to ethics and legal aspects of nursing, history.

Communications and Human Relations.

Classroom activities are planned to assist students in development of knowledge, understanding, appreciations, and attitudes basic to effective nursing of patients of all ages and backgrounds with nursing needs arising both from the individuality of the patient and from inability for self-care as a result of a health deviation. The student is encouraged to develop beginning skills in analysis of patients needs, both through classroom study of hypothetical patient situations and through planned patient experiences in the clinical environment. Beginning skills in nursing methods are developed through planned laboratory experiences, followed by related practice in actual patient care.

Clinical activities provide introduction to actual patient care through selected clinical assignments requiring application of current classroom and laboratory learnings.

Prerequisite: Admission requirements

PRACTICAL NURSING II

SECOND QUARTER

OBJECTIVES: To assist practical nursing students to acquire further knowledge and understanding and to develop further skills needed for rendering safe and effective nursing care to patients of all ages.

Course Material:

Medical—Surgical I
Pediatrics I, II, III

Classroom activities center around analysis of nursing needs as viewed in perspective with the needs arising from the individuality of the patient and from the illness condition. Related information is presented as it is relevant to the student's understanding of and ability to meet nursing needs of patients.

Clinical activities provide selected experiences in patient care in order for the student to develop skill in applying classroom larnings to a variety of patient situations.
Prerequisite: Practical Nursing I

PRACTICAL NURSING III

THIRD QUARTER

OBJECTIVES: To assist practical nursing students to acquire knowledge of common disease conditions and to develop beginning skills in rendering safe and effective nursing care to patients of all ages with specific needs arising from the illness and/or therapy.

Course Material:

Medical—Surgical II
Obstetrics
Drugs and Drug Administration

Classroom activities center around analysis of nursing needs arising from the specific illness condition and the medical plan.

Clinical activities consist of guided experiences in nursing patents with conditions which illustrate classroom learnings.
Prerequisite: Practical Nursing II

PRACTICAL NURSING IV

FOURTH QUARTER

OBJECTIVES: To assist advanced practical nursing students to acquire knowledge of needs of patients who are seriously ill, to develop beginning skills in assisting the registered nurse and/or physician in complex nursing situations, and to make the transition to the role of graduate practical nurse.

Course Material:

Medical—Surgical II and III
First Aid
Civil Defense

Classroom activities center around the needs of seriously-ill patients of all ages, of labor patients, and of patients immediately following surgery.

Clinical activities consist of guided experiences in the care of seriously-ill patients, labor patients, and surgery patients, and is planned to parallel classroom learnings whenever possible.
Prerequisite:: Practical Nursing III

RADIO AND TELEVISION SERVICING

Within recent years improved electronic techniques have provided expanded entertainment and educational facilities in the form of monochrome and color television, frequency-modulated radio, high-fidelity amplifiers and sterophonic-sound equipment. These developments require expanded knowledge and skill of the individual who would qualify as a competent and up-to-date serviceman.

This curriculum provides a training program which includes the basic knowledge and skills involved in the installation, maintenance and servicing of radio, television and sound-amplifier systems. A large portion of time is spent in the laboratory verifying electronic principles and developing servicing techniques.

A radio and television serviceman may be required to install, maintain and service amplitude-modulated and frequency-modulated home and auto radios, transistorized radios, monochrome and color television sets, intercommunication, public address and paging systems, high-fidelity and stereophonic amplifiers, record players and tape recorders.

His work will require meeting the public both in the repair shop and on service calls. A serviceman who establishes his own business will also need to know how to maintain business records and inventory.

RADIO AND TELEVISION SERVICING

CURRICULUM BY QUARTERS

		Hours Per Week		Quarter Hours
FIRST QUARTER		Class	Lab	Credit
ELC	1112-C—Direct and Alternating Current	12	6	14
ENG	1101-C—Communication Skills	2	0	2
MAT	1101—Applied Mathematics	5	0	5
		19	6	21
SECOND QUARTER				
MAT	1102—Applied Mathematics	5	0	5
ENG	1102-C—Communication Skills	2	0	2
ELN	1122-C—Vacuum Tubes and Circuits	2	6	4
ELN	1126-C—Transistor Theory and Circuits	4	6	6
		13	12	17
THIRD QUARTER				
ELN	1125-C—Radio Receiver Servicing	3	2	4
PSY	1101—Human Relations	2	0	2
ELN	1127-C—Tele. Receiver Circuits & Servicing	6	4	7
ELN	1128—Transistor Theory and Circuits	5	3	6
		16	9	19
FOURTH QUARTER				
ELN	1131-C—Tele. Receiving Servicing (includes color)	11	12	15
BUS	1103—Small Business Operations	2	0	2
		13	12	17

RADIO AND TELEVISION SERVICING

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Elc 1112-C—Direct and Alternating Current: A study of the structure of matter and the electron theory, the relationship between volage, current and resistance in series, parallel and series-parallel circuits. Analysis of direct current circuits by Ohm's law and Kirchoff's law; sources of direct current potentials. Fundamental concepts of alternating current flow; a study of reactance, impedance, phase angle, power and resonance and alternatig current circuit analysis.
Prerequisite: None

Eng 1101-C—Communication Skills: The first of two courses designed to improve the student's abilities in all areas of communications. Emphasis during the first quarter will be placed on the development of improved reading habits and basic composition skills.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

SECOND QUARTER

Mat 1102—Applied Mathematics: Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations; addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.

Prerequisite: Mat 1101

Eng 1102-C—Communication Skills: A continuation of Eng 1101-C. In addition to reading and writing, the principles of effective speech will be practiced. Writing practice will include the filling out of job applications, composing personal history, statements, writing request for references, and then procedures related to job acquisition.

Prerequisite: Eng 1101-C

Eln 1122-C—Vacuum Tubes and Circuits: An introduction to vacuum tubes and their development; the theory, characteristics and operation of vacuum diodes, semi-conductor diodes, rectifier circuits, filter circuits, triodes and simple voltage amplifier circuits.

Prerequsite: None

Eln 1126—Transistor Theory and Circuits: Transistor theory, operation, characteristics and their application to audio and radio frequency amplifier and oscillator circuits.

Prerequisite: None

THIRD QUARTER

Eln 1125-C—Radio Receiver Servicing: Principles of radio reception and practices of servicing; included are block diagrams of radio receivers, servicing techniques of AM and FM receivers by resistance measurements, signal injection, voltage analysis, oscilloscope methods of locating faulty stages and components and the alignment of AM and FM receivers.

Prerequisite: None

Psy 1101—Human Relations: A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationships within the work situation.

Prerequisite: None

Eln 1127-C—Television Receiver Circuits and Servicing: A study of principles of television receivers, alignment of radio and intermediate frequency amplifiers, adjustment of horizontal and vertical sweep circuits will be taught. Techniques of troubleshooting and repair of TV receivers with the proper use of associated test equipment will be stressed. Additional study of more specialized servicing techniques and oscilloscope waveform analysis will be used in the adjustment, troubleshooting and repair of the color television circuits.

Prerequisite: None

Eln 1128—Transistor Theory and Circuits: Emphasis will be placed on techniques of trouble shooting and repair of TV receivers with the proper use of associated test equipment. This course will be primarily based upon application of principles previously studied.

Prerequisite: None

FOURTH QUARTER

Eln 1131-C—Television Receiver Servicing (includes color): A broad servicing course including trouble shooting, radios, television, record players, sound systems, and other electronic communication devices. Major emphasis will be placed upon studying colored television principles and theories. The service and repair of colored television sets will be included for laboratory work.
Prerequisite: Eln 1127-C

Bus 1103—Small Business Operations: An introduction to the business world, problems of small business operation, basic business law, business forms and records, financial problems, ordering and inventorying, layout of equipment and offices, methods of improving business, and employer-employee relations.
Prerequisite: None

WELDING

This curriculum was developed to fill the tremendous need for welders in North Carolina. The recently completed Manpower Survey shows quite clearly that many welders will be needed annually to fill present and projected vacancies in the State.

The content of this curricuum is designed to give students sound understanding of the principles, methods, techniques and skills essential for successful employment in the welding field and metals industry.

The field of welding offers a person prestige, security and a future of continuous employment with steady advancement. It offers employment in practically any industry: shipbuilding, automotive, aircraft, guided missiles, railroads, construction, pipe-fitting, production shop, job shop and many others.

Welders join metals by applying intense heat, and sometimes pressure, to melt the edges to form a permanent bond. Closely related to welding is "oxygen cutting." Of more than 35 different ways of welding metals, arc, gas, and inert gas welding are the three most important.

The principal duty of the welder using manual techniques is to control the melting by directing the heat from either an electric arc or gas welding torch, and to add filler metal where necessary to complete the joint. He should possess a great deal of manipulative skill with a knowledge of jigs, welding symbols, mathematics, basic metallurgy, and blueprint reading.

WELDING

		Hours Per Week		Quarter Hours
FIRST QUARTER		Class	Lab	Credit
WLD	1120—Oxyacetylene Welding and Cutting	3	12	7
DFT	1111—Blueprint Reading for Welding	2	2	3
MEC	1115-C—Applied Metallurgy	3	0	3
MEC	1112—Machine Shop Processes	0	3	1
		8	17	14
SECOND QUARTER				
WLD	1121—Arc Welding	3	12	7
MAT	1101-C—Applied Mathematics	3	0	3
DFT	1112—Blueprint Reading for Welding	2	2	3
PHY	1101—Applied Science	3	0	3
		11	14	16
THIRD QUARTER				
WLD	1124—Pipe Welding	3	9	6
WLD	1123—Inert Gas Welding	0	3	1
DFT	1117-C—Blueprint Reading: Welding	0	3	1
PHY	1103—Applied Science	3	0	3
ENG	1101-C—Communication Skills (5½ weeks)	2	0	2
ENG	1102-C—Communication Skills (5½ weeks)	2	0	2
		10	15	15
FOURTH QUARTER				
WLD	1122—Commercial and Industrial Practices	3	6	5
WLD	1125—Certification Practices	0	6	2
MAT	1102-C—Applied Mathematics	5	0	5
DFT	1118-C—Pattern Development and Sketching	0	3	1
PSY	1101—Human Relations	2	0	2
		10	15	15

WELDING

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Wld 1120—Oyacetylene Welding and Cutting: Introduction to the history of oxyacetylene welding, the principles of welding and cutting, nomenclature of the equipment, assembly of units. Welding procedures such as practice of puddling and carrying the puddle, running flat beads, butt welding in the flat, vertical and overhead position, brazing, hard and soft soldering. Safety procedures are stressed throughout the program of instruction in the use of tools and equipment. Students perform mechanical testing and inspection to determine quality of the welds.

Prerequisite: None

Dft 1111—Blueprint Reading: Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.

Prerequisite: None

Mec 1115-C—Applied Metallurgy: Investigates the properties of ferrous metals and tests to determine their uses. Instructions will include some chemical metallurgy to provide a background for the understanding of the physical changes and causes of these changes in metals. Physical metallurgy of ferrous metals producing iron and steel, theory of alloys, shaping and forming, heat treatments for steel, surface treatments, alloy of special steel, classification of steels, and cast iron will be topics of study.
Prerequisite:: None

Mec 1112—Machine Shop Processes: To acquaint the student with the procedures of layout work and the correct use of hand and machine tools. Experiences in the basic fundamentals of drill press and the lathe operation; hand grinding of drill bits and lathe tools; set-up work applied to the grade.
Prerequisite: None

SECOND QUARTER

Wld 1121—Arc Welding: The operation of AC transformers and DC motor generator arc welding sets. Studies are made of welding heats, polarities, and electrodes for use in joining various metal alloys by the arc welding process. After the student is capable of running beads, butt and fillet welds in all positions are made and tested in order that the student may detect his weaknesses in welding. Safety procedures are emphasized throughout the course in the use of tools and equipment.
Prerequisite: None

Mat 1101-C—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Dft 1112—Blueprint Reading for Welding: A thorough study of trade drawings in which welding procedures are indicated. Interpretation, use and application of welding symbols, abbreviations, and specifications.
Prerequisite: Dft 1104

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

THIRD QUARTER

Wld 1124—Pipe Welding: Designed to provide practice in the welding of pressure piping in the horizontal, vertical, and horizontal-fixed position using shielded metal arc welding processes according to Sections VIII and IX of the ASME code.
Prerequisite: Wld 1121

Wld 1123—Inert Gas Welding: Introduction and practical operations in the use of inert-gas arc welding. A study will be made of the equipment, operation, safety and practice in the various positions. A thorough study of such topics as: principles of operation, shielding gases, filler rods, process variations and applications, manual and automatic welding.
Prerequisites: Wld 1120, Wld 1121

Dft 1117-C—Blueprint Reading: Welding: A thorough study of trade drawings in which welding procedures are indicated. Interpretation, use and application of welding symbols, abbreviations, and specifications.
Prerequisite: Dft 1104

Phy 1103—Applied Science: Will discuss briefly heat and thermometry, principles of force, motion, work, energy, and power. Study principles of operation of the basic electric welding machines—AC, DC, AC-DC combination with high frequency and motor generator. Industrial gases, their discovery and use in industry—oxygen, acetylene, argon, hydrogen, helium, carbon dioxide—and their mixtures such as 25% CO_2 and 75% argon, 98% argon and 2% oxygen.

Prerequisite: Phy 1101

Eng 1101-C—Communication Skills: The first of two courses designed to improve the student's abilities in all areas of communications. Emphasis will be placed on the development of improved reading habits and basic composition skills.

Prerequisite: None

Eng 1102-C—Communication Skills: A continuation of Eng 1101. In addition to reading and writing, the principles of effective speech will be practiced. Writing practice will include the filling out of job applications, composing personal history, statements, writing request for references, and then procedures related to job acquisition.

Prerequisite: Eng 1101-C

FOURTH QUARTER

Wld 1122—Commercial and Industrial Practices: Designed to build skills through practices in simulated industrial processes and techniques: sketching and laying out on paper the size and shape description, listing the procedure steps necessary to build the product, and then actually following these directions to build the product. Emphasis is placed on maintenance, repairing worn or broken parts by special welding applications, field welding and nondestructive tests and inspection.

Prerequisites: Wld 1120, Wld 1121

Wld 1125—Certification Practices: This course involves practice in welding the various materials to meet certification standards. The student uses various tests including the guided bend and the tensile strength tests to check the quality of his work. Emphasis is placed on attaining skill in producing quality welds.

Prerequisites: Wld 1120, Wld 1121, Wld 1123, Wld 1124

Mat 1102-C—Applied Mathematics: A study of basic concepts of mathematics in a direct relationship to Drafting. Transactions, decimals, powers and roots, percentages, ratio and proportions. An introduction to Trigonometry used in Drafting.

Prerequisite: Mat 1101

Dft 1118-C—Pattern Development & Sketching: This course is designed for the student who has the basic knowledge of blueprint reading and sketching. It presents the practical shop or field layout methods used by pipe welders. Layouts are made on templet paper beginning with the simple pan and progressing to the most complex lateral connections that are used in industrial pipings. The student learns the steps in making rectangular and cylindrical layouts and patterns of offsets and intersections used on commercial jobs.

Prerequisites: Dft 1104, Dft 1117-C

Psy 1101—Human Relations: A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationships within the work situation.

Prerequisite: None

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EXTENSION & GENERAL ADULT EDUCATION DIVISION

EXTENSION DIVISION

The Cape Fear Technical Institute provides training in numerous areas through its Extension programs. Extension classes are held both at the school and at various locations throughout New Hanover, Brunswick and Pender Counties. These classes are designed to prepare individuals for employment or to upgrade workers already employed.

The extension department also serves area industries and public agencies by providing training for their employees. Training under this division of the Institute can be offered at any time a need for such training is established. Full details can be obtained by contacting the Director of Extension programs at the school.

Admission Requirements

Generally speaking any individual who is 18 years of age or whose high school class has graduated is eligible for admission to extension classes; applicants are usually admitted on the first come, first served basis. Some classes may have specific adminission requirements, in such cases the Director of Extension programs will inform applicants of these requirements.

Expenses

Many of the extension classes are offered without charge to the students; in other cases a small fee is charged to cover the cost of instructional supplies. Any charges should be paid at the first class session.

Certificates

The Extension Division issues certificates to those who complete a course satisfactorily.

EXAMPLES OF EXTENSION PROGRAMS OFFERED

Air Conditioning & Refrigeration
Aircraft Assembly
Auto Mechanics
Auto Electricity
Basic Electronics
Blueprint Reading
Commercial Fishing
Crab Processing
Electricity
Electronic Circuits
Furniture Upholstery
Instrumentation
Janitorial Maintenance
Loom Fixing
Machine Shop Practice
Machine Diesel Mechanics
Metal Burning
Net-Making & Mending
Power Sewing
Slide Rule
Small Engine Repair
Supervisory Development Courses
Tailoring
Tourist Serving Training
Waitress Training

AGRICULTURAL

Farm Records
Fertilizers and Lime
Pesticides
Welding for Farmers
Ornamental Horticulture

BUSINESS

Typing
Bookkeeping
Shorthand

CONSTRUCTION

Bricklaying
Carpentry
Housewiring
Plumbing

PUBLIC AGENCIES

Fire Training
Fire Officer Training
Fire First Aid
Nurses' Aide
Orderlies Training
Police Training
Teachers Aides

SUPERVISORY DEVELOPMENT

The Art of Motivating People
Effective Writing
Effective Speaking
Human Relations
Industrial First Aid
Effective Communications
Job Methods
Industrial Safety & Accident Prevention
Job Analysis Training
Work Measurement

This list, of course, is in no way comprehensive, but is offered as a general sample of extension-type courses. For further information on this division contact the Director of Continuing Education.

GENERAL ADULT EDUCATION

The General Adult Education division of the Cape Fear Technical Institute is primarily concerned with raising the educational level of adults and providing cultural improvement courses. The Institute is prepared to provide training at all educational levels from grade one (learning to read and write) up through high school equivalency. This training is provided through organized classes and throuh the school's Programmed Instruction Centers.

HIGH SCHOOL EQUIVALENCY CERTIFICATE

The State of North Carolina, through the State Board of Education permits adults (19 years of age) to take the General Educational Development Tests, (generally referred to as "the High School Equivalency Examination") at test centers throughout the State. Persons who make satisfactory scores on all five sections of the test are issued the High School Equivalency Certificate by the State Board of Education. This certificate is recognized by most industries, schools, and government agencies as meeting their requirement for a high school education. Cape Fear Technical Institute is a G.E.D. test center. The test is generally given once each month; applications for the tests may be obtained from the Institute or from the office of any school superintendent.

The Institute provides training in the five areas covered by the examination both through organized classes and the Learning Laboratory.

ORGANIZED CLASSES

Classes in adult education are organized as follows:

Basic Education I — For those adults who have completed less than four grades of formal education.

Basic Education II — For those adults who stopped school in grades 5-8 or who have completed Basic Education I.

Secondary I — For those adults who stopped school in grades 9-10 or who have completed Basic Education II.

Secondary II — For those adults who stopped school in grades 11-12 or who have completed Secondary I.

The school's Programmed Instruction Center provide training for those who are not able to attend the organized classes. See the Programmed Instruction Center Section (page 146) for full details.

In addition to the organized classes at the basic and secondary education levels, the General Adult Division offers a large variety of courses both at the school and throughout the area it serves. The type and frequency of these offerings are determined by the demand and interest in a given area of study. A sampling of courses under this heading would include:

Law for the Layman

Homemaking — Sewing and Food Preparation

Driver Education for Adults

Remedial Mathematics for the Prospective College Student

Remedial English for the Prospective College Student

Modern Math for Parents

Conversational French

Conversational Spanish

Speed Reading and Reading Improvement

Creative Art

Creative Writing

Public Speaking

Citizenship Studies for Naturalization

Interior Decorating for Homeowners

First Aid

Auto Mechanics for Car Owners

Ceramic Arts and Crafts

Additional courses are offered as the demand becomes evident. Details of these and other courses may be obtained from the Director of General Adult Education.

Admission Requirements

Any adult who has a desire to raise his or her educational level and who is able to benefit from a course may enroll in the general adult classes.

Expenses

There is no charge for the Basic Education and only a small fee to cover the cost of instructional materials in the Secondary I and II classes. Charges for other general adult classes are determined by the length of the courses and instructional materials needed.

PROGRAMMED INSTRUCTION CENTER

The Cape Fear Technical Institute Programmed Instruction Center — A Brief Summary of What It Is

The Programmed Instruction Center at the Cape Fear Technical Institute is designed to provide study opportunities in practically any field that might be of interest to residents of the New Hanover, Pender or Brunswick Couny area.

Persons interested in participating in the Programmed Instruction Center, after an initial interview, are provided study materials starting at a point in keeping with their achievement level and are able to progress from there. Students may elect study times adjusted to their convenience and schedules.

A "Programmed Instruction Center" is essentially an individual study situation, in which any person eighteen years of age or older may undertake most any level of Reading, English, Math, Social Studies, or Science that he desires. All of the material used in the lab is programmed; therefore, there is no need for a classroom teacher. In fact, efforts have been made to remove all semblances of a classroom from the Programmed Instruction Center.

Programmed material is designed in such a manner as to aid the student in learning information in small sequences called "Frames." Each frame requires an immediate response, and each response is immediately checked. If the student fails to learn, or learns incorrectly, the program makes the correction or re-teaches. In this manner the student progresses at his own rate; he neither has to wait for others to catch up nor slow down to someone else's rate.

The coordinator, the person in charge of the Programmed Instruction Center, has the responsibility of locating the level at which a student can proceed to learn by himself, of formulating the sequence of programs the student will undertake to achieve his desired goal, and of administering the tests that will assure the student that he is approaching his goal.

Because there are no classes in the learning lab, there is no need for anyone to wait until the new quarter to enroll. Each student sets his own work sessions and attends the lab as many days each week and as many hours each day as he thinks he can attend regularly. There are no fees, and any adult can take as many courses as fit his needs.

The majority of students presently enrolled in Programmed Instruction Center are seeking to prepare themselves for the high

school equivalency examination or to gain educational improvement of their own choosing. Some, however, are enrolled to upgrade themselves for a possible job promotion; while others are using the program for reinforcement in a technical institute curriculum or in their college work.

Admission Requirements for Programmed Instruction Center

Any adult over 18 years of age who has a desire to raise his or her educational level and who is able to benefit from study in the Programmed Instruction Center may enroll.

Expenses

There is no charge for study in the Programmed Instruction Center.

Courses

Some of the fields in the Programmed Instruction Center are: Mathematics, English, Foreign Languages, Reading Improvement, Social Sciences, Natural Sciences, Nursing, Electronics, and Business. Courses are added almost daily. There are over 400 different courses offered now.

Locations

There are two Programmed Instruction Centers in operation now. One is in the building, room 416, of Cape Fear Technical Institute and another is at the Neighborhood Facility on South Walker Rd. (South 117 Business) in Burgaw.

New Industry Training

One of the basic objectives of Cape Fear Technical Institute is to stimulate the creation of more challenging and rewarding jobs for the people of our area by providing a customized training service to new and expanding industries. Subject to only minimal limitations, this institution, in cooperation with the Industrial Services Division of the State Department of Community Colleges, will design and administer a special program for training the production manpower required by any new or expanding industry creating new job opportunities in North Carolina.

This program includes the following services:

1. Consultation in determining job descriptions; defining areas of training; and in prescribing appropriate course outlines, training schedules, and materials.
2. Selecting and training of instructors. These instructors may be recruited from the company and from outside sources.

3. Payment of instructors' wages for the duration of the training program.
4. Provision of suitable space for a temporary training facility prior to the completion of the new plant, should such temporary space be required. This may be space with Cape Fear Technical Institute or leased space in the community.
5. Assumption of installation costs of equipment in the temporary training facility.
6. Payment for one-half the cost of nonsalvageable materials expended in the training program.

The purpose of this service is to help a new or expanding industry meet its immediate manpower needs and to encourage each industry to develop a long-range training program of its own to satisfy its continuing replacement and retraining needs.

For further details of this service, please contact the President, Cape Fear Technical Institute or the Director, Industrial Services Division, North Carolina Department of Community Colleges Raleigh, North Carolina.

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